Strategically placed mineral mix supplements and traditional salt placement on grazing distribution in the Italian Alps

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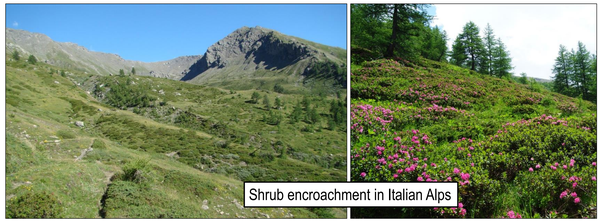
Introduction

- Throughout the 20th century, socio-economic transformations in the Alps have led to a large-scale decline in livestock farming and agriculture. As a consequence, people moved to the valley bottoms and the traditional agro-pastoral systems collapsed, especially in unproductive and remote mountain valleys.
- The ecological repercussion of this shift in land use is natural succession from grasslands, to shrub domination and, ultimately, to forest.
- Use of rotational grazing system (RGS) and strategic supplement placement to manipulate livestock grazing management may slow down or reverse ecological succession toward shrubs and help sustain natural grasslands in the Alps.



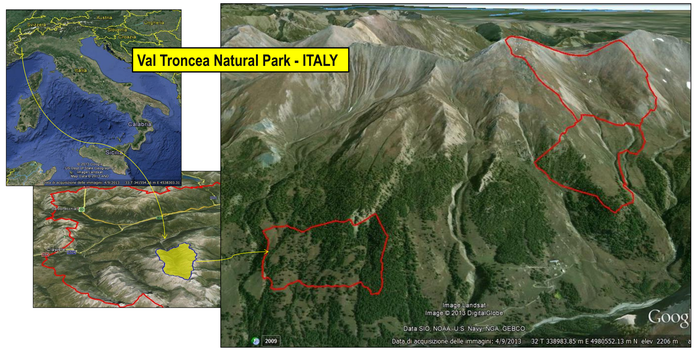
Shrub encroachment in Italian Alps

Objectives

- Determine the effect of strategic placement of mineral mix supplement (MMS) and traditionally salt (TS) placement on cattle grazing patterns
- Examine structural vegetation changes in MMS treatment areas and corresponding control areas
- Evaluate the efficacy of strategic MMS placement as tool to increase cattle use of undergrazed areas within the pastures

Study area

- The study was conducted in Val Troncea Natural Park, Piedmont, Italy
  - A protected area representative of the changes that have occurred on grasslands in the Western Italian Alps.
- Three pastures encompassing a total of 133 ha were:
  - grazed from 24 June to 26 August 2013
  - by 119 Piedmontese beef cows, including heifers and non-lactating cows
  - in according to the prescribed local Pastoral Plan.



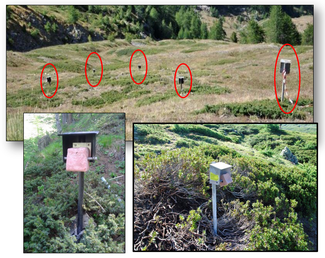
Methods

- 11 randomly selected cows were tracked with Global Position System (GPS) collars. Positions were recorded every 15 min, with an average accuracy of 6 meters;

- The grazing period within each paddock was divided into **two equal 7 to 10 day sub-periods**, randomly chosen between:

Mineral Mix Supplement (MMS)

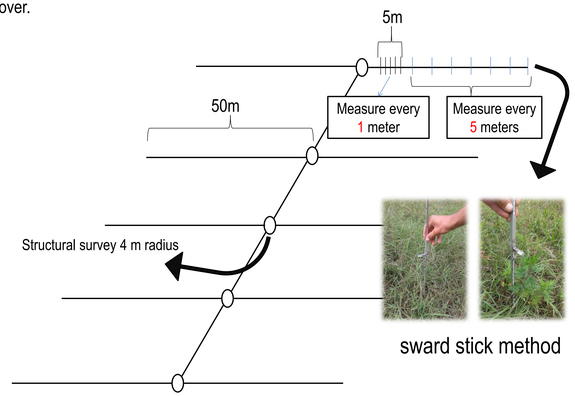
Supplied through 5-kg blocks on five fixed poles placed along 50 meters transects in steep undergrazed and shrub-encroached sites



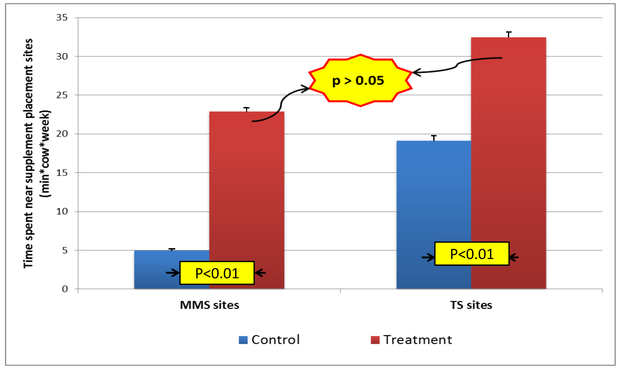
Traditional Salt (TS)

Supplied by the farmer (25 kg fed 2-3 times in each pasture) on flat rocks in flat herbaceous areas

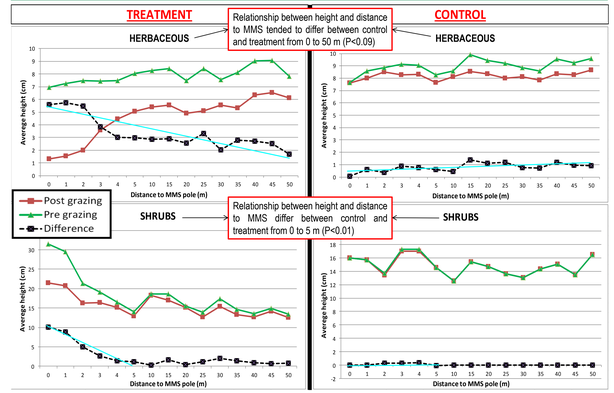
- Time spent by cows near to MMS and TS was calculated using the number of GPS fixes within 10 m of supplement ;
- For both MMS and TS treatment sites, a control area with similar morphological and vegetation characteristics was identified;
- At MMS treatment sites vegetation transects were established at the 5 supplement placement sites with similar protocol in MMS control sites.
  - Average shrub and herbaceous height was measured every meter from 0 to 5 meters, then every 5 meters from 5 to 50 meters left and right of MMS placement (pole) before and after grazing (sward stick method);
  - A structural survey was performed within a 4-meter radius of the MMS placement before and after grazing, estimating shrub, herbaceous, bare ground and rock cover.



Results–Time spent within 10 m buffer MMS and TS areas by cattle



Results – Vegetation structure variation in MMS sites



Results – Vegetation height variation within MMS sites

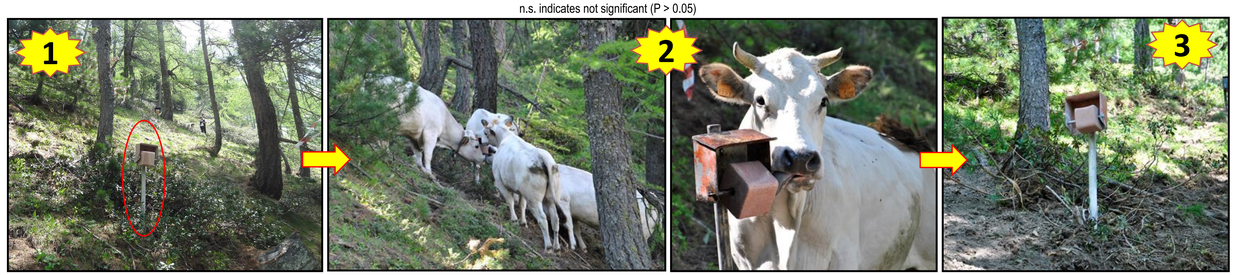
TREATMENT AREAS

	Pre grazing		Post grazing		
	MMS sites	S.E.	MMS sites	S.E.	P value
Shrub cover (%) ↓	51.10	4.60	30.30	4.83	p<0.05
Herbaceous cover (%) ↓	27.10	3.02	11.60	1.78	p<0.001
Bare ground cover (%) ↑	18.50	3.00	54.10	5.89	p<0.001
Rock cover (%) =	3.30	0.93	4.00	0.88	n.s.

CONTROL AREAS

	Pre grazing		Post grazing		
	MMS sites	S.E.	MMS sites	S.E.	P value
Shrub cover (%) =	41.67	3.40	41.67	3.40	n.s.
Herbaceous cover (%) =	33.73	3.30	33.53	3.37	n.s.
Bare ground cover (%) =	18.07	2.12	18.26	2.11	n.s.
Rock cover (%) =	6.53	1.21	6.53	1.21	n.s.

n.s. indicates not significant (P > 0.05)



Conclusion

Considering that **MMS** blocks were placed within steep, shrub encroached, historically underused areas, and **TS** was supplied on flat and more accessible sites:

- Cows spent **more time** within **treatment** areas **than control** areas in both MMS and TS periods
- Cows spent the **same** amount of **time** at **TS** sites as **MMS** sites
- **Herbaceous height reduction** within 50 m and **shrubs height reduction** within 5 m from the MMS poles was **greater in treatments** sites than control sites

Management implications

- Cows grazed steep, shrub dominated and underused areas near MMS at the same intensity as flat and herbaceous areas with TS
- Cows, through trampling, grazing, and fecal deposition may help restore vegetation structure and composition around supplement sites, reducing shrubs and increasing soil fertility and then, forage pastoral value in the years to come

Strategically placed MMS is a promising tool to increase cattle use of steep, underused, and shrub-encroached areas within large pastures.