Restoration of shrub-encroached alpine grasslands using temporary night camp areas for cattle
Agro-pastoral ABANDONMENT in SW ITALIAN ALPS

LIVESTOCK FARMS (- 92%) ↓ ANIMALS per HERD
WORKERS per FARM ↓
CATTLE HEADS (- 44%) and HERDS ↓

HERDING ↓ CONTINUOUS GRAZING

OVERGRAZING in FLAT AREAS ↑
UNDERGRAZING in STEEP AREAS ↑

Introduction
OBJECTIVE: RESTORATION of SUBALPINE SEMI-NATURAL GRASSLANDS

1960 - 2010

TREE and SHRUB-ENCROACHMENT

Permanent grasslands and meadows (- 62%)

Objectives
Arrangement of TEMPORARY NIGHT CAMP AREAS (TNCA) for cattle on steep and shrub-encroached locations

HIGH GRAZING PRESSURE, TRAMPLING, DEPOSITION of URINE and DUNG, and SEED TRANSPORTATION

CHANGES in VEGETATION STRUCTURE and COMPOSITION

RESTORATION POTENTIAL: 4 YEAR MONITORING
### STUDY AREA

<table>
<thead>
<tr>
<th>Piedmont Region</th>
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<tbody>
<tr>
<td>Val Troncea Natural Park</td>
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<tr>
<td><strong>Shrub cover:</strong> 2% (1982) → 18% (2011)</td>
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</tbody>
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| 2 Cattle farms remained: |
| Giletta and Raso |

**Materials and methods**

Laufen 2015
Arrangement of **TEMPORARY NIGHT CAMP AREAS (TNCA)**

**STUDY AREA:** 75 ha, 160 beef cows (135 AU) grazing for 22 d in July 2011

- **Cattle** for 2 consecutive nights within each area, delimited with electric fences
- Mean **extent** of TNCA: **1107 m²**
- **Stocking density:** 0.12 AU m⁻²
VEGETATION SURVEY: 1 TRANSECT at each TNCA and control site

A. STRUCTURE: cover (%) of shrub, herbaceous and bare ground layers + average height of shrub and herbaceous layers (sward stick method; Stewart et al. 2001)

B. BOTANICAL COMPOSITION: vertical point-quadrat method (Kohler et al. 2004), 100 points of vegetation measurement (cover of species belonging to different phytosociological units)

C. BIODIVERSITY INDICES: species richness + Shannon diversity index

D. VEGETATION INDICES: Pastoral value of the vegetation (Daget and Poissonet, 1971) + Landolt soil nutrient value
Laufen 2015

CHANGES IN VEGETATION STRUCTURE

Shrub cover (%)

Herbaceous cover (%)

Bare ground cover (%)

Height of the herbaceous layer (cm)

Results
Results

**Changes in Botanical Composition**

Mesophilic nutrient-rich species (*Molinio-Arrhenatheretea*) (%)

Nitrogen-poor calcareous dry species (*Festuco-Brometea*) (%)

Nitrogen poor calcareous high-elevation species (*Elyno-Seslerietea variae*) (%)

Nitrogen poor acidic species (*Juncetea-Trifidi, Nardetea-Strictae*) (%)

Fringe and tall herb species (*Epilobietea-Angustifolii, Mulgedio-Aconitetea, Trifolio-Geranietea*) (%)

Boreal shrubland and woodland species (*Loiseleurio-Vaccinietea, Vaccinio-Piceetea excelsae*) (%)

Laufen 2015
CHANGES IN PLANT COMMUNITY COMPOSITION

Increase in the cover of nutrient-rich species

Decrease in the cover of nutrient-poor and woodland species

Results
Laufen 2015

CHANGES IN BIODIVERSITY AND VEGETATION INDICES

Species richness
- Control Sites
- TNCA

Shannon diversity index

Pastoral Value

Landolt soil nutrient content

Results
The arrangement of TNCA:

- **sustainable practice** to restore subalpine semi-natural grasslands
- **more feasible** than mechanical shrub-clearing and prescribed burning within steep and rugged alpine locations
- can enhance **vegetation structure and composition and soil properties** over a longer term
Thank you for your attention!