

# **Restoration of shrub-encroached alpine grasslands using temporary night camp areas for cattle**

Massimiliano Probo<sup>1</sup>, Marco Pittarello<sup>1</sup>, Michele Lonati<sup>1</sup>, Giampiero Lombardi<sup>1</sup>

<sup>1</sup>Department of Agricultural, Forest and Food Sciences, University of Torino, Largo Braccini 2, 10095, Grugliasco, Torino

The decline of pastoral activities in many alpine regions over the last decades has led to an extensive tree and shrub-encroachment of semi-natural grasslands, with a reduction of the ecosystem services provided by these open habitats. In the Val Troncea Natural Park (western Italian Alps) we arranged temporary night camp areas (TNCA) for cattle over shrub-encroached areas to counteract and reverse this process and to restore semi-natural sub-alpine grasslands. We surveyed vegetation along permanent transects for four years after the arrangement of TNCA, which were carried out in summer 2011. We measured the effects produced on vegetation structure (cover and height of the herbaceous and shrub layers), vegetation composition (cover of species belonging to different phytosociological units and biodiversity indexes), and plant community variables (pastoral value and Landolt soil nutrient value). Four years after their implementation, TNCA were effective in reducing the cover of shrubs and increasing both herbaceous cover and height ( $p < 0.01$ ). Moreover, the cover of species typical of mesophilic and nutrient-rich grasslands and the cover of fringe and tall herb grassland species significantly increased ( $p < 0.05$ ). Conversely, the cover of nutrient-poor grassland species did not change over time, as well as the overall plant biodiversity, but both pastoral value and soil nutrient value were significantly enhanced ( $p < 0.001$ ). These findings highlight that the arrangement of TNCA can be an effective and sustainable practice to restore shrub-encroached grasslands in steep and rugged alpine locations.

Keywords:

Pastoral value,

Plant biodiversity,

Semi-natural grasslands,

Targeted grazing