

>> SYNTHESIZE MOUNTAINS OF KNOWLEDGE <<

Submitted Abstract

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Title	Long-Term Effects Of Mowing And Mineral Fertilization For The Restoration Of A Brachypodium Rupestre-Invaded Grassland In Western Alps.
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Abstract

In mountain environments, the cessation of extensive farming and inadequate management practices have led to serious vegetation changes, which negatively affect forage yield and quality and the ecosystem services provided by mountain grasslands. Besides promoting tree and shrub encroachment, the reduction of agricultural practices induces the invasion of competitive coarse grasses, such as *Brachypodium rupestre* (Host) Roem. & Schult. This species is highly competitive due to its elevated tiller density, branching frequency, and clonal growth. Moreover, silica-rich and hairy leaves make *B. rupestre* a low-quality forage species for livestock. The aim of this research was to assess the single and combined effects of mowing and mineral fertilization on the reduction of *B. rupestre* coverage in an abandoned grassland of the Western Italian Alps, over the long-term (10 years, from 2006 to 2015). The study area was a secondary grassland dominated by *B. rupestre* located at Gran Bosco di Salbertrand Natural Park, at 1360 m a.s.l. Four treatments were applied in the area: mowing (M), mineral fertilization (F, 120 kg/ha N - 80 kg/ha K₂O - 80 kg/ha P₂O₅), mowing coupled with mineral fertilization (MF), and control (not mown and not fertilized). A split-plot experimental design was used with mineral fertilization in the main plot and mowing in the subplots, for a total of 16 2x5-m subplots (four replicates per each treatment). Botanical composition within each subplot was surveyed with the vertical point-quadrat method before treatment application. The cover of *B. rupestre* was similar amongst treatments in 2006 and 2007 whereas marked differences were measured in 2013 and 2015: M and MF had a lower cover of *B. rupestre* compared to F and control. All the treatments except were effective in reducing *B. rupestre* cover, while it did not change in the control. MF and M resulted in an increase of medium-high forage value species over time, as shown by a Principal Response Curve. Conversely, *B. rupestre* was replaced by plant species with medium and low forage values only in M.

The results of this research showed that the most effective practice to reduce *B. rupestre* cover was MF, followed by M. Conversely, F alone determined a negligible reduction. The advantage of combining mowing and fertilization was the increase of nutrient-demanding plant species, which are also characterized by a higher forage quality. However, effects on vegetation were evident only after six years of treatment application.