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ASSESSING THE EFFECTIVENESS OF REVEGETATION METHODS FOR MOUNTAIN GRAZING RESOURCES PRESERVATION IN THE MONTSENY BIOSPHERE RESERVE (NE SPAIN)

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OBJECTIVE

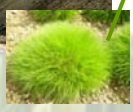
This study aims to evaluate the effectiveness of three revegetation treatments in high mountain pastures of the Montseny Biosphere Reserve in relation to feed supply, nutritional value and species diversity of the communities established seven year after restoration.

A Commercial Seed Mixture + **Three Revegetation Techniques**

30 % *Achillea millefolium*
20 % *Festuca arundinacea*
20 % *Lolium perenne*
30 % *Lotus corniculatus*

→ Hand showing

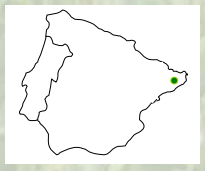
→ Regular Hydroseeding



→ Hydroseeding and post-transplanting single native species of *Festuca gautieri*

STUDY SITE

High mountain pastures of Montseny Biosphere Reserve (1,400 - 1,700 a.s.l)



- **2.5 ha of subalpine grassland vegetation have been restored of a whole of 430 ha.**
- **Climate: Atlantic**
  Average rainfall of ca. 1,000 mm
  Mean annual temperature of ca. 7°C.
- **Stocking livestock: 0.7 LU/ha.**

RESULTS

Table 1. **Chemical composition and nutritive value of grass in the restored samples and adjacent native pastures (non degraded).**

	DM	OM	CP	NDF	ADF	ADL	DOM	UFL
Native pasture	275.4 **a**	941.2	143.3 **ab**	565.6 **a**	285.2	41.7	578.69 **ab**	0.75 **ab**
Hydroseeding	234.8 **ab**	939.2	129.1 **bc**	443.0 **b**	253.9	31.3	587.99 **a**	0.77 **a**
Hydroseeding & *F.gautieri*	211.1 **b**	944.8	165.1 **a**	440.5 **b**	263.5	43.5	597.32 **a**	0.78 **a**
Hand sowing	261.4 **a**	937.9	102.1 **c**	531.5 **ab**	292.6	33.1	564.12 **b**	0.73 **b**
p	*0.0036*	*ns*	*0.0002*	*0.0023*	*ns*	*ns*	*0.0075*	*0.0176*

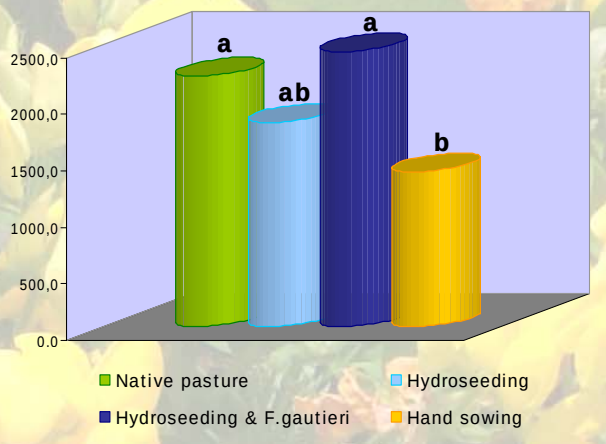
Dry matter (DM g/kg), organic matter (OM), crude protein (CP), neutral detergent fibre (NDF), acid detergent fibre (ADF), acid detergent lignin (ADL) and digestible organic matter (DOM) content (g/kg DM); Milk forage units (UFL/ kg DM); n= 8 (quadrate area of 0,25m²); Means in the same column with different letters (a,b) were significantly different (p< 0,05).

Table 2. **Diversity indices in the restored samples and adjacent native pastures.**

	Species Richness	Shannon-Weaver Index
Native pasture	23 **a**	2,26 **a**
Hydroseeding	13 **b**	1,95 **ab**
Hydroseeding & *F.gautieri*	16 **b**	2,06 **ab**
Hand sowing	15 **b**	1,72 **b**
p	*0,0014*	*0,0164*

Species richness = total number of species recorded in four random linear transects (6 m) ; Shannon-Weaver diversity index = - Σ pi ln pi , where pi is the proportion of individuals in the i-th species. (p< 0,05).

Figure 1. **Grass production (g DM/m²) in revegetation treatments and natural plots**



Grass production was measured by harvesting a quadrate area of 0.5 m x 0.5 m in each sampling plot at the end of the spring phase (n=8); (p< 0,05).

CONCLUSIONS

- **The two hydroseeded treatments presented higher productivity and nutritional quality than hand sowing treatment, achieving the values of native pastures.**
- **Less diversity was found in restored areas than in undisturbed vegetation. However, Shannon-Weaver index was not significant in hydroseeded areas compared to native pastures.**
- **The use of revegetation techniques, such as hydroseeding, which improve the ability to establish seeded species could be effective for grazing resources restoration in severe environments.**

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