

# PLANT COMMUNITIES AND SOIL GROUPS IN MOUNTAIN PASTURES OF THE CENTRAL PYRENEES



J. ASCASO, M. ALCUBILLA, A. BROCA and C. FERRER

Department of Agriculture and Agricultural Economics, University of Zaragoza,  
Miguel Servet 177 E-50013 Zaragoza, Spain



## INTRODUCTION

Mountain pastures in the Central Pyrenees are located at an altitude between 1,400 and 2,400 m a.s.l., and characterized by a distinct physiognomy, phytosociology and use as extensive pastures during summer time. To establish a sustainable use of these pasture areas, it is necessary to obtain a profound knowledge of this phytocoenoses and of the biotic and abiotic factors that govern them. The aim of this project was to determine the relationship between the vegetation units and the soils.

## METHODS

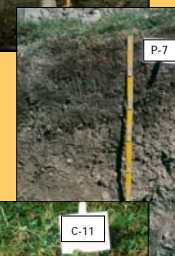
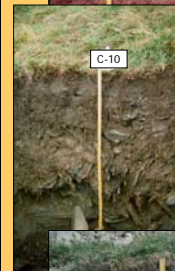
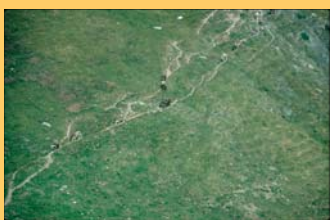
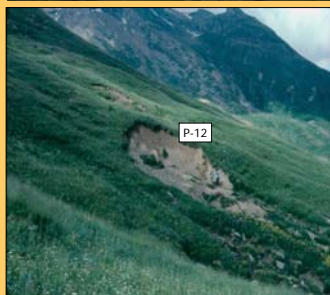
Investigation was carried out in the Benasque Valley (Spanish Central Pyrenees), including 8,700 ha of mountain pasture. Five toposequences representing different lithological substrates and geomorphological characteristics of the area were selected. A total of 60 soil profiles were studied, determining their morphological, chemical and physical properties and their classification. Inventories of vegetation were done in the corresponding pastures after the methods of the Zurich-Montpellier school of phytosociology and the plant communities were established.

## RESULTS

A great diversity of plant communities (24 associations, 14 alliances) appears in mountain pastures of the Benasque Valley (Central Pyrenees) related to 12 soil groups (Table). The abundance of well-developed soils (mostly eutric and dystric Cambisols) with high vegetation cover suggests that the use of these pastures has not conducted to significant ecosystem degradation.

Relationships between vegetation and soils in mountain pastures (Spanish Central Pyrenees).  
The figures indicate the distribution of the 60 soil profiles / plant associations.

PLANT COMMUNITIES		SOIL GROUPS											
		Leptosols, Dystric	Leptosols, Eutric	Gleysols, Mollic	Gleysols, Umbric	Gleysols, Eutric	Podzols, Umbric	Stagnosols, Dystric	Cambisols, Humic	Cambisols, Dystric	Cambisols, Eutric	Regosols, Calcic	Regosols, Eutric
ALLIANCE	ASSOCIATION												
<b>Alpine and subalpine communities on calcareous substrates</b>													
<i>Iberidion spathulatae</i>	<i>Festuco-Cirsietum glabri</i>												2
<i>Mesobromion</i>	<i>Teucro-Astragalum catalaunici</i>										1		2
<i>Festucion gautieri</i>	<i>Saponario-Festucetum gautieri</i>											1	
	<i>Seslerio-Festucetum gautieri</i>										2		
<i>Elynyon medioeuropaeum</i>	<i>Elyno-Oxytropidetum halleri</i>										2		
<i>Seslerio-Pinenion</i>	<i>Pulsatillo-Pinetum uncinatae</i>										3		1
<b>Subalpine and mountain communities on calcareous substrates</b>													
<i>Rumicion pseudoalpini</i>	<i>Rumici-Chenopodietum pseudoalpini</i>												1
<i>Polygono-Trisetion</i>	<i>Alchemillo-Trollietum</i>										1		1
<i>Mesobromion</i>	<i>Genistello-Agrostidetum capillaris</i>										3		
	<i>Phyteumo-Festucetum nigrescentis</i>										1		
	<i>Euphrasio-Plantagnetum mediae</i>											6	
<b>Alpine and subalpine communities on siliceous substrates</b>													
<i>Nardion strictae</i>	<i>Selino-Nardetum</i>				1								1
	<i>Alchemillo-Nardetum strictae</i>							1			2		2
	<i>Alchemillo-Nardetum bellardiochloetosum</i>												2
	<i>Alchemillo-Nardetum festucetosum eskiae</i>										2		2
	<i>Ranunculo-Festucetum eskiae</i>						1				2		
<i>Festucion eskiae</i>	<i>Carici-Festucetum eskiae</i>										4		
	<i>Hieracio-Festucetum paniculatae</i>										2		
<i>Festucion airoidis</i>	<i>Arenario-Festucetum yesii</i>				1								1
	<i>Hieracio-Festucetum airoidis vacciniotosum microphylli</i>										3		
<i>Rhododendro-Vaccinion</i>	<i>Saxifrago-Rhododendretum</i>				1						1		
<i>Juniperion nanae</i>	<i>Arctostaphylo-Pinetum uncinatae</i>										1		
<b>Bog communities</b>													
<i>Caricion nigrae</i>	<i>Caricetum nigrae</i>												1
<i>Caricion davallianae</i>	<i>Caricetum davallianae</i>												2



## CONCLUSION

The abundance of deep Cambisols with different physical and chemical properties was particularly striking. Vegetation and soil are intimately connected to the different environmental factors: altitude, steepness of terrain, lithology, and geomorphology.

