



PENNING

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GRAZING BY LIVESTOCK HAS A SIGNIFICANT IMPACT ON ECOSYSTEM FUNCTIONING, AS IT INFLUENCES THE STRUCTURE OF THE PLANT COMMUNITIES AND CHANGES THE SPECIES BIODIVERSITY.

Some plant species benefit from the effect of grazing while others completely disappear from the ecosystem. Excessive overgrazing may even lead to land degradation and complete loss of biodiversity. Over the last centuries, the grazing of livestock has shifted towards maximal production on small enclosed areas. But several traditional methods to herd livestock might be more beneficial to biodiversity, soil health and even economic returns.

One of the traditional methods that is widely practiced in the Dehesas y Montados agricultural systems in Spain and Portugal is the penning, also called the *majadeo*. This method consists in the enclosing of herds of livestock (mainly sheep and goats) in portable pens. This is done in a systematic and timed manner to provide the soil with sufficient fertilization and to control the grazing of livestock. With this method, farmers are able to control the structure and the botanical presence of their agricultural ecosystem in a way that is impossible with permanent grazing pens. The penning is also an effective measure to protect livestock against predators.



THREATS TO THE PRACTICE

The penning practice is under threat from modern livestock herding practices that focus on maximization of profit with the lowest costs, meaning also the least space necessary. Important for the penning practice is the constant follow-up of the areas in the pastures, and the placement of the penning according to the growth and nutrient cycles of the plants and the climatic conditions. In recent years, many pastures have abandoned the practice because of the extra labour and/or management requirements, but this has caused a loss in grass production, lower water retention of the soil and an increased risk of soil erosion and wildfires. The penning are important practices that are able to increase the soil fertility of Mediterranean pastures, but require more labour by hand that exceed the current working hours rhythm (Rodríguez-Estévez 2006).

RECOGNITION AND FUNDING

An ancient traditional method known for the Dehesas y Montados regions of Spain and Portugal, several variations for livestock management occur in other places around the world. The method is receiving recognition from local NGOs focusing on traditional methods used in agricultural systems in Spain and Portugal. With the Common Agricultural Policy programme of the European Commission, focus should be given to the soil recovery and closed nutrient cycle capabilities of the penning practice. The Payment for Ecosystem Services, could be very beneficial for the conservation of agrobiodiversity and aid rural communities prioritizing the use of traditional farming methods.

1. CULTURAL SUSTAINABLE LAND-USE PRACTICES

In the same way as for wild herds of grazers, the penning allows for a consistent movement of livestock. Grazing and fertilization are planned in a systematic manner to allow plant growth and recovery to happen. The placing of the portable fences happens during the night time, mostly in a controlled manner, but depends of course heavily on the climatic conditions (Rodríguez-Estévez 2006). The implementation of penning has a significant effect on the health of the agricultural ecosystem, compared to continuous grazing methods.

Besides the increase in the quality of the meat, farmers are noticing an increase in soil fertility, biodiversity, productivity and community dynamics. The livestock droppings provide nitrogen and potassium to the soils, and contribute towards organic matter and its water retention capacities (Rodríguez-Estévez 2006). The fertilization of the soil happens at a local place, no input from outside is needed and no contamination of other areas in necessary, leading towards a closed nutrient cycle.



Goats & Mandra,
Lemnos
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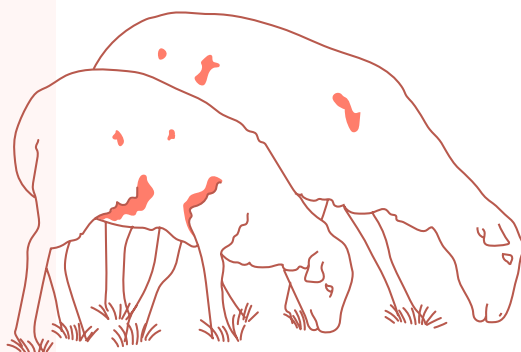
Grazing activities in West Bekaa © Asaad Saleh SPNL

TECHNICAL DETAILS

	Necessary material	Metal, wooden or plastic pens with possible electric wire and gates. Metal is heavier but quicker to install and costs less
	Time period	Any time of the year, except for times with heavy rain and with lambs. Changed every 2-3 days. 6 years waiting before same spot
	Economic costs	Additional costs for the pens and the maintenance of the pens. Possibly compensated by reduced costs for fertilizers
	Location	Suitable for freshly cleared or unproductive areas

RESEARCH BY THE ALLIANCE FOR MEDITERRANEAN NATURE AND CULTURE (AMNC)

Several studies have been done by local NGOs comparing the penning practice to other grazing methods, but the scientific studies focusing on the penning practice date from the 20th century. A dying practice with great potential, more research could be implemented to study the positive effects of the practice on the biodiversity, community and climate change. As part of a study by the AMNC on cultural heritage in the Mediterranean, focus was given on the traditional practice of penning working with the local communities from the Dehesas y Montados in the Iberian Peninsula. At the Mundos Nuevos farm in Badajoz (Extremadura, Spain), they use the penning techniques to herd together sheep and goats at night to recover and allow fertilisation of the soil. Using GIS techniques, the High Nature Value of parcels in the region were assessed and the benefits of the penning techniques highlighted.



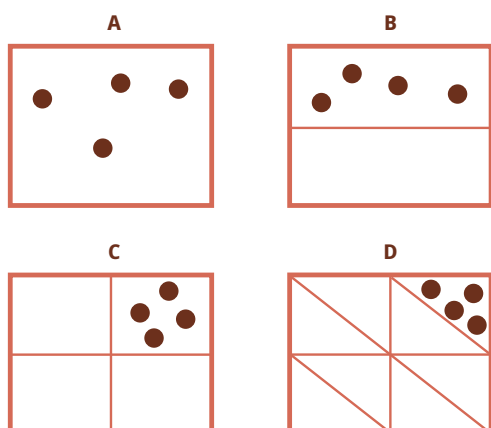
2. BENEFITS OF THE PRACTICE

2.1. BIODIVERSITY

The areas that have been used for penning benefit from the increased manure and trampling of the livestock and exhibit a higher diversity of plant species. With the diversity in plant species comes a higher variety of above and below ground biodiversity. In natural situations, livestock with a gregarious nature would also have specific resting grounds exhibiting higher trampling and mature levels (Rodríguez-Estévez 2006). In modern agriculture, these areas are very small and barren, as a result of insufficient time for these grounds to recover (Rodríguez-Estévez 2006). Penning allow for a more equal distribution of organic matter over the pasture lands, but also increases the health of the livestock as they move on healthier soils with fresh grass that had time to recover.

Relationship between grazing divisions and animal density. Example with an area of 1 ha total, 180 days of growth, 90 days of period recovery and 1 lot, where the TR is the time recovery and TP is the grazing time.

		TR	TP	Animal density
A	Continuous grazing	0	180	4 animals / ha.
B	2 fences	90	90	8 animals / ha.
C	4 fences	90	30	16 Short times must be ensured grazing that avoid overgrazing of plants Grazing time = Recovery time / (No. of fences - 1) 18 animals / ha
D	8 fences	90	13	32 animals / ha.



2.2. CULTURAL

The penning practice is linked to the local communities and to their culture. Many local names exist for the traditional practices surrounding livestock farming and the penning practice. The constant planning for the penning practice is coordinated with other activities on the farm, and all together they allow farmers to efficiently organize the management of their farms. Besides the economic benefits and benefits for the health of their pastures and livestock, the traditional practice of penning give farmers an autonomy over the planning of their pasture lands.

2.3. CLIMATE CHANGE

The penning practice has many benefits for the health of the agricultural ecosystem. A study investigating the Grass Health Index (an index reflecting the health of grasslands), found a significant increase in the 11 biological indicators for areas that have undergone penning practice, including ground cover, soil compaction and regeneration. Since pasture lands occupy more than one third of all the surfaces, they could play a key role as carbon sinks. Proper pasture management with traditional penning practice allows for erosion reduction, increased nutrient cycle efficiency, better water infiltration and carbon sequestration. After solely 2 years of implementation, the penning practice has already shown promising results for ecosystem health, including better nutrient cycles, water infiltration, more compact soils and higher organic matter.



Sheep herd in the dehesa © Concha Salguero

2.4. SOCIO-ECONOMICAL

Besides the environmental benefits, the penning practice also proves beneficial to the livelihood of farmers. There is an increase of profitability visible after solely 2 years of implementation, as the pastures are higher in cover and the external costs for feeding reduce. Adding to this are the reduced costs for tillage, the maintenance of machinery and the reduced costs for outside fertilizers as the grounds are fertilized directly by the excrements of livestock. Finally, farmers also notice a higher value of their livestock, and sell the meat for higher prices. However, there is an increase in manual labour needed for the penning practice and possible additional costs could be required (Rodríguez-Estévez, 2006).

3. REFERENCE LIST

Proyecto Dehesas & Montados en la Península Ibérica (n.d.) *Buenas prácticas en Dehesas & Montados: Redileo para el control del matorral*. Asociación Trashumancia y Naturaleza, WWF España, ANP-WWF Portugal.

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Rodríguez-Estévez (2006, invierno) El majadeo o redileo. *La Fertilidad de la Tierra*, 23, 63-66. [La Fertilidad de la Tierra Revista de Agricultura Ecológica](http://www.mapa.gob.es), ISSN: 1138-6193 (mapa.gob.es)

Grazing activities dehesas © Ofelia de Pablo y Javier Zurita WWF Spain

