

# IMPORTANCE OF BROWSING ON SHRUBS

Opportunities for animal nutrition and conservation of shrublands silvopasture systems



## THE WHAT AND WHY

### Browsing shrubs as a food resource and management tool

European heathlands are usually linked to land use practices as cutting, burning and grazing, and are supported by the EU within the high nature value farming framework. Nonetheless, the rural depopulation and abandonment of management practices contribute to large accumulations of highly flammable phytomass in heathlands and other shrublands of the Atlantic area of EU, thus being more susceptible to wildfires.

Grazing by livestock can improve rural sustainability while controlling the accumulation of flammable woody

vegetation. It can also be a sustainable management tool for shaping and maintaining semi-natural habitats, and promoting greater biodiversity and multifunctionality.

There is a social demand of organic products, which includes meat obtained from free-range livestock management. Rustic local breeds can benefit from browsing on different shrubs that not only cover their austere nutritional needs, but also provide with natural antibiotics compatible for an organically grown animal production.



Local breed Cachena, a rustic traditional cattle located in areas bordering the National Park Xurés/Peneda-Geres.  
<http://www.verinbiocoop.com/cachena>



Native and rustic Caldela from NW Spain, registered as one of the various European endangered cattle breeds.  
<http://www.verinbiocoop.com/caldela>

## HOW IS THE CHALLENGE ADDRESSED

### The chance for traditional rustic animal breeds

European local cattle breeds (e.g. Vianesa, Frieiresa, Cachena, Maronesa or Arouquesa, in NW Spain and Portugal) are recognized by their important environmental, social, cultural, market and public values, and have the protected geographical status from the European Commission. Over the past decades, its population has suffered a drastic decline and there is great interest in their recovery. These traditional breeds are very rustic and their nutritional requirements, frequently expressed

as protein and energy needs, are easier to manage. They are adapted to browse on plants considered of "limited" nutritional value (heaths, gorse and hard grasses). Free ranging horses are also compatible with heathland conservation management, maintaining biodiversity values and animal production in Europe. They can effectively reduce gorse biomass (*Ulex*), a leguminose shrub that they prefer instead of heaths.



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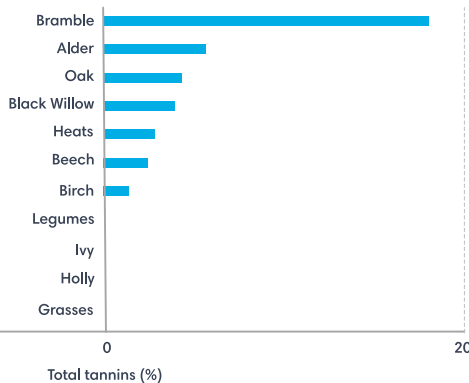
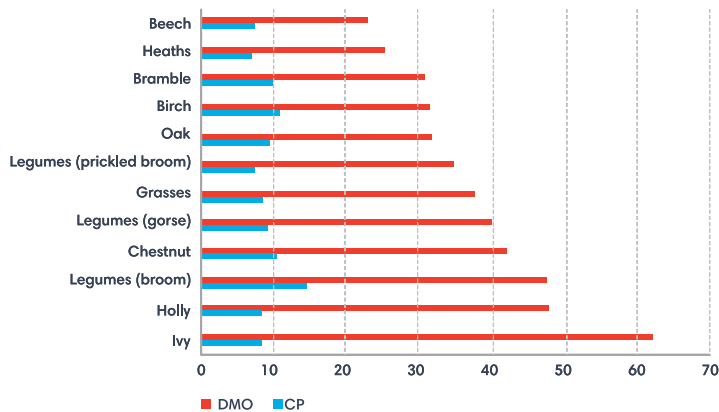
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## HIGHLIGHTS

Rustic local breeds benefit from browsing on shrubs that cover their austere nutritional needs and provide natural antibiotics compatible with an organically grown animal production. Moderate levels of tannins in heaths can be beneficial. Optimum to moderate protein content in woody legumes can be an important protein resource. Digestibility of shrubs is in the moderate-to-low side, but compatible with rustic breeds that can act as efficient management tools to reduce combustible phytomass and prevent fire risk.



Percentages of digestibility (DMO), crude protein (CP), and tannins in some woody plants. Values correspond to apical portions no longer than 15 cm and less than 1 cm in twig diameter, or leaves. González-Hernández, MP

### FURTHER INFORMATION

González-Hernández MP, Karchesy J, Starkey E (2003) Research observation: hydrolyzable and condensed tannins in plants of northwest Spain forests. *J Range Manage* 56:461–465

González-Hernández MP, Silva-Pando FJ (1999) Nutritional attributes of understory plants known as components of deer diets. *J Range Manage* 53:132–138

López López C, Rosa García R, Ferreira LMM, García U, Osoro K, Celaya R (2017) Impacts of horse grazing on botanical composition and diversity in different types of heathland. *Rangeland J* 39: 375–385

Mouhbi R, Santiago-Freijanes JJ, González-Hernández MP, Mosquera-Losada MR (2012) Horse grazing systems: understory biomass and plant biodiversity of a *Pinus radiata* stand. *Sci Agric* 69: 38–46

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## ADVANTAGES AND DISADVANTAGES

### Nutritional attributes of shrubs; their pros and cons.....

Nutritional requirements for extensive livestock are often expressed as protein and energy needs. Coarsely, optimum of crude protein in diets is established around 9% (6% for maintenance and up to 12% to meet livestock needs in lactation stages). Digestibility of feed intake is desirable to reach 45% (digestibility of organic matter). Based on these minimum values, a mix of different shrubs and seasonal forbs and grasses can meet nutritional requirements for rustic cattle and free-range horses (see figure). On the other hand, the presence of tannins, frequently in shrubs, can induce beneficial effects, especially in ruminants. They are complex cocktails that can prevent gastrointestinal parasites, and have higher difficulty to develop resistance compare to synthetic antibiotics. This can become an inexpensive alternative with potential in organic farming. Their also antioxidant properties help with reducing fat oxidation and therefore preventing rancid flavor in meat. The insoluble tannin-protein complexes in the digestive tract reduce methane production (consequently also pollution) in livestock with diets rich in legumes. Low to moderate levels of tannins led to higher retention of nitrogen in sheep and cattle, resulting in higher growth rates and milk yield, and acting as preventive on bloat.

Conversely, tannins may perform as nutritional constraints causing toxicity, acting as deterrents because of their bitterness, or negatively interfere in digestion or absorption of proteins. Browsers used to rich tannins diets have adaptive mechanisms to neutralize those effects, whereas grazers that prefer herbaceous plants with no tannins will show less tolerance. Levels of tannins between 20-40 mg/g are considered moderate, and with possible benefits, whereas, above 70 mg/g, are too high and possibly detrimental. Leguminose shrubs such as broom (*Cytisus* spp.) and gorse (*Ulex* spp.) lack tannins and are a good protein source. In general, heathlands are rich in tannins but with contents considered moderate for ruminants (see Figure).

Considerations: Browsing increases biodiversity and may act as an efficient tool when is well managed. Horse grazing, for example, can decrease gorse dominance and promote heaths composition in heathlands of conservation value, thus facilitating grasses and forbs, which are more preferred plant groups for cattle or sheep. On the other hand, high cattle densities may invert this tendency affecting plant diversity negatively. Animal stocking rates should be monitored in sustainable management of shrublands and promote balance of animal and plant productivity. This can be complex, but there are ways - as observing and managing the presence or disappearance of key plant species (i.e. intense grazing: plants of high and low quality are consumed; moderate grazing: some plants of medium and high quality are used; light grazing: only preferred plants of better quality consumed).

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