

# THE SPANISH DEHESA

*A traditional Mediterranean silvopastoral system  
linking production and nature conservation*



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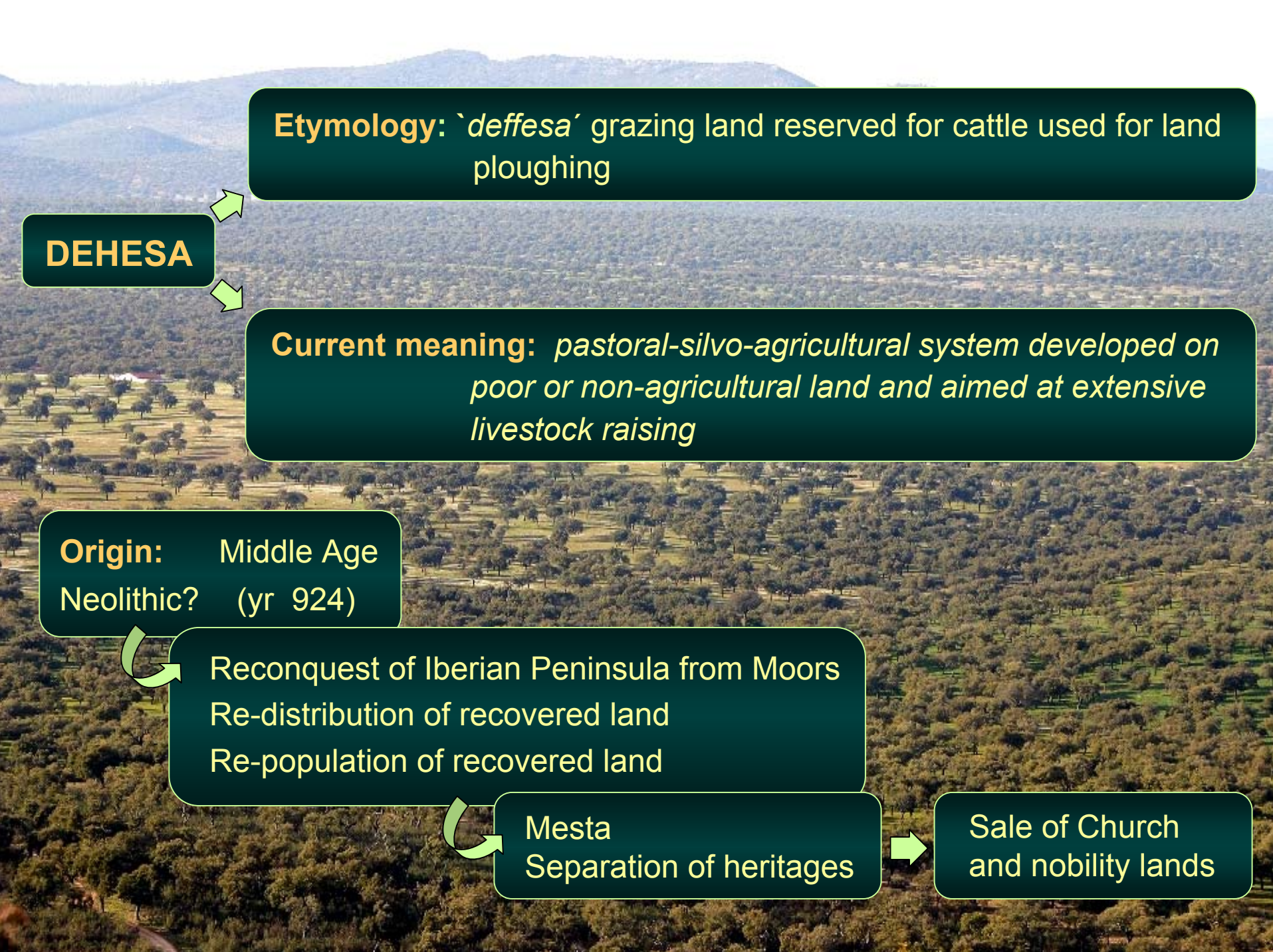


## **INTRODUCTION**

## **STRUCTURE AND MANAGEMENT**

- The tree layer
- Natural pastures
- Crops, including sown pastures
- Livestock
- Hunting species

## **ENVIRONMENTAL QUALITY**



**Etymology:** `deffesa' grazing land reserved for cattle used for land ploughing

**DEHESA**

**Current meaning:** *pastoral-silvo-agricultural system developed on poor or non-agricultural land and aimed at extensive livestock raising*

**Origin:** Middle Age  
Neolithic? (yr 924)

Reconquest of Iberian Peninsula from Moors  
Re-distribution of recovered land  
Re-population of recovered land

Mesta  
Separation of heritages

Sale of Church and nobility lands

# THE NATURAL ENVIRONMENT

Major features:

- **Mediterranean climate:** summer withering herbaceous pastures  
perennial trees and shrubs  
fruits (acorns)
- **Poor soils:** eventual cropping
- **Flat or hilly topography:** soil variation with slope  
nutrient and water cycles

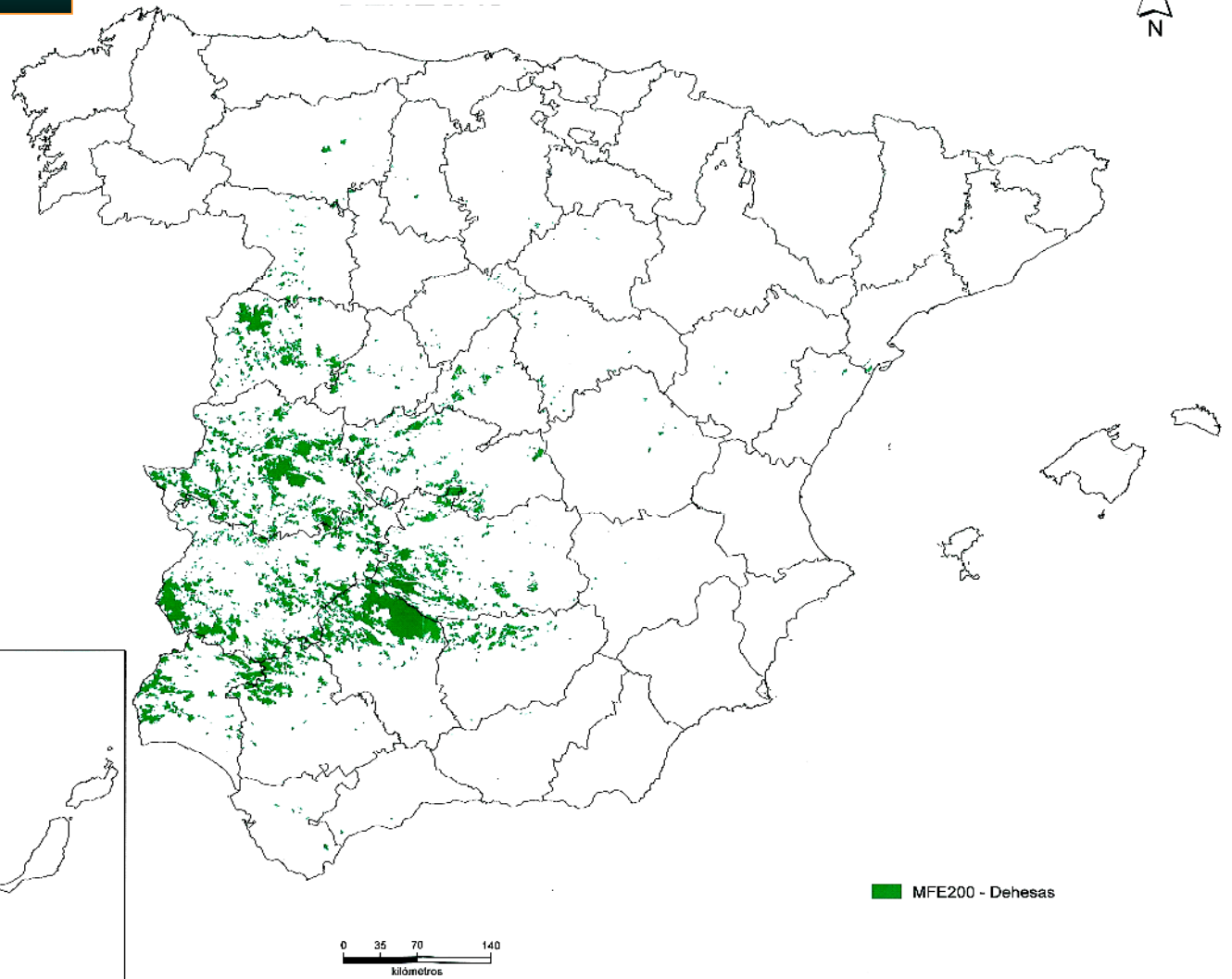
The dehesa, as every other traditional agroforestry system, is the result of the co-evolution of man and that difficult natural environment: it uses a strategy of **efficiency** and **diversification** of structures with the aim of taking advantage of every natural resource with a minimum input of energy and materials



Typical landscape of Mediterranean Spain on poor and acid soils

*The dehesa system has persisted for millennia, and exists today, because of its versatility (diversity); because it has been, and it is now, the most efficient system to satisfy the changing demands of the human society within that difficult natural environment*

# DISTRIBUTION



**AREA: 3.5 – 4 million ha**

The dehesa is a **human-made system**: a more efficient one than a forest in satisfying human demands, but an unstable one, because its **persistence** relies upon its own **management**. That is why that **management is also a powerful conservation tool**.





Trees



Shrubs



Natural pastures



Sown pastures



Crops



Livestock



Wildlife



Invertebrates



Endangered species

*The link between the high structural and biological diversity of the dehesa and its efficiency and stability is the high diversity of relationships between its components. They are so closely entangled by that net of inter-relationships that the management of every single component necessarily affects each of the others*



## THE TREE LAYER



*If trees were not essential in the dehesa system,  
they would have disappeared long time ago*

- General stability
- Temperature
- Humidity
- Nutrient cycles
- Soil
- Physical protection
- Wind
- Landscape
- Competence with herb layer
- Fodder
- Fuel wood, charcoal
- Cork
- Fungus

**TYPICAL SPANISH DEHESA  
PERENNIAL TREE SPECIES  
(Permanent fodder bank)  
(Fruit crop is essential)**

Holm oak, cork oak, other species

(15) 20 – 100 (200) trees/ha

Basal area: 2 – 10 (15) m<sup>2</sup>/ha



- Acorns
- Fuelwood
- Charcoal
- Browse
- Cork
- Edible fungi



*Browsing can be done either on pruned branches or directly on trees and shrubs*



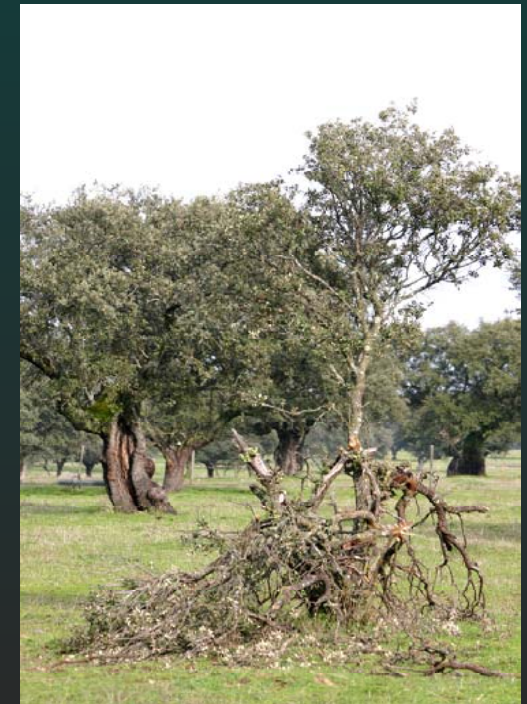
# REGENERATION OF THE TREE LAYER

*Natural regeneration of the tree layer is usually easy at early stages, but nowadays seedling mortality is almost complete due to the current pastoral use.*

**TODAY, THE LACK OF REGENERATION OF THE TREE LAYER IS THE MOST IMPORTANT PROBLEM FOR SPANISH DEHESAS**



Regeneration of high forest dehesas is more difficult than that of coppices, due to the large root systems of the latter





*The sudden death of trees, known as 'seca' accelerates the decrease of the tree density, thus increasing the importance of the lack of natural regeneration*

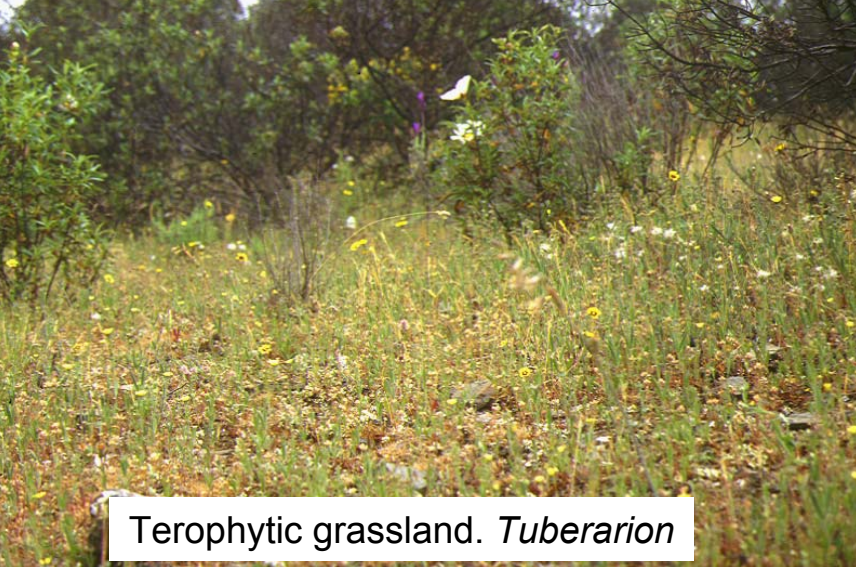


*Reforestation (densification), with the complement of protection structures against livestock or wildlife, is a suitable way to guarantee the future of the Spanish dehesa*

# NATURAL PASTURES



- Fodder (seasonal)
  - Dynamism
  - Healing tissue
- Spatial heterogeneity
    - Phytosociological types
    - Below and out of crown cover
  - Temporal heterogeneity
  - Diversity (plants and seeds)
- Legumes (*Fabaceae*) are essential



Terrophytic grassland. *Tuberarion*



Majadal. *Poetalia*. Detail mid-spring



Majadal-Vallicar  
*Poetalia-Agrostietalia*

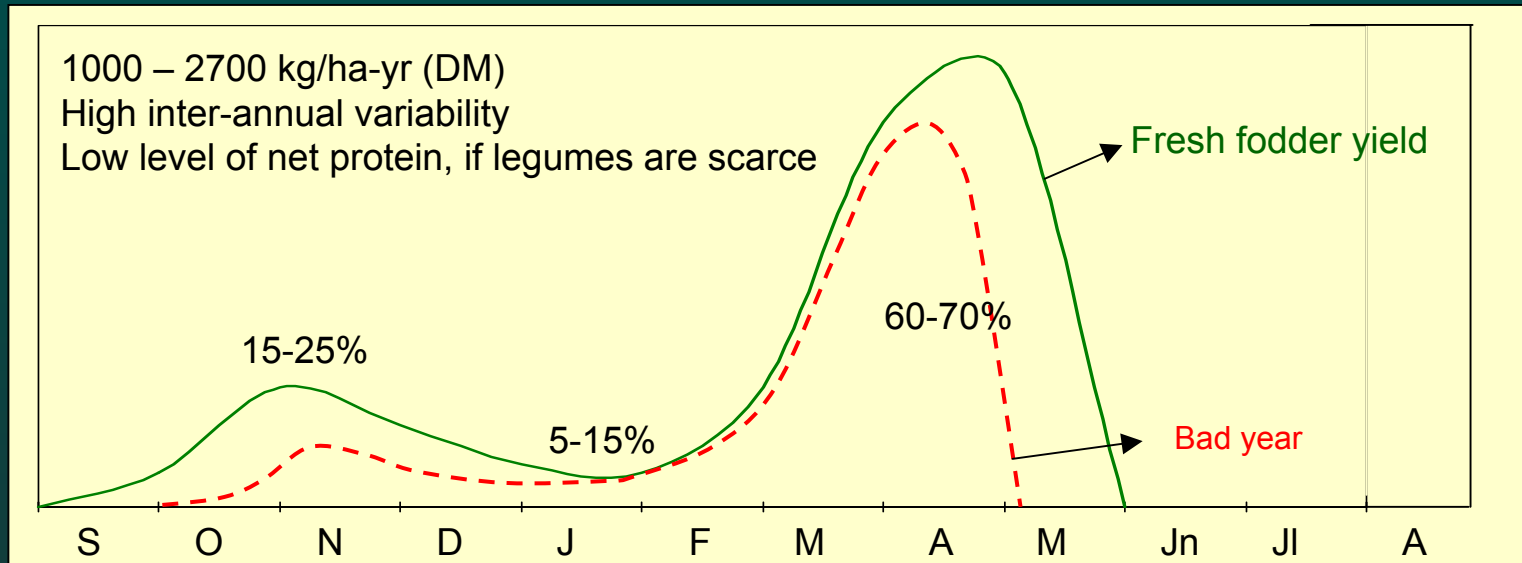


Posío: *Brometalia*

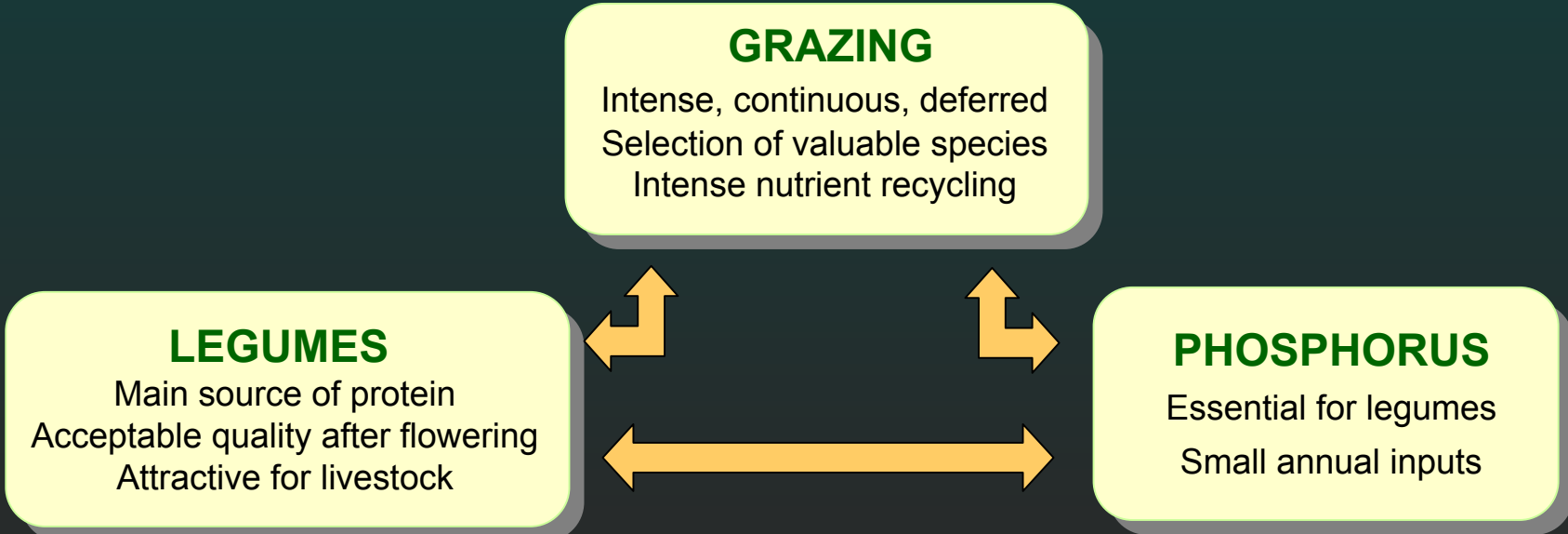


Majadal. *Poetalia*. Late spring





**Three basic guidelines for pasture management at the dehesa system**



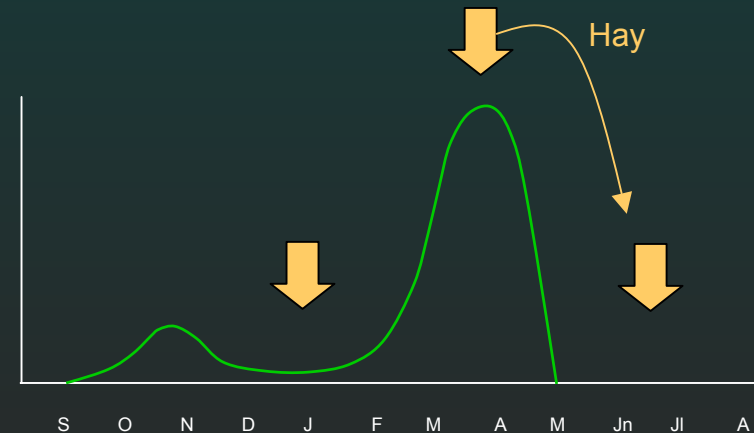
# CROPS, INCLUDING SOWN PASTURES

*The dehesa is not an agricultural system*



Shallow and poor soils

- Source of food
  - for humans
  - for livestock and wildlife
- Complement to natural pastures (seasonal distribution and quality)
- Control of woody vegetation
- Carried out eventually





*Oat – barley crop (3-4 year/cycle) on a dehesa of central Spain*



*Trifolium subterraneum* sown pasture, grazed by red deer (*Cervus elaphus*), in a cold dehesa, 6 years after establishment. Montes de Toledo, central Spain

# LIVESTOCK

- Major final product of the system
- Main tool for creating and improving grass swards (*grazing optimization*)
- Tool for controlling woody vegetation
- Transporter of fertility (nutrients)
- Disperser of species (zoochory)
- Accelerator of nutrient cycles
- Manager of species diversity

*Efficient extensive system: low production, low cost, high quality, enviromentally sound*



## LIVESTOCK SPECIES. SHEEP

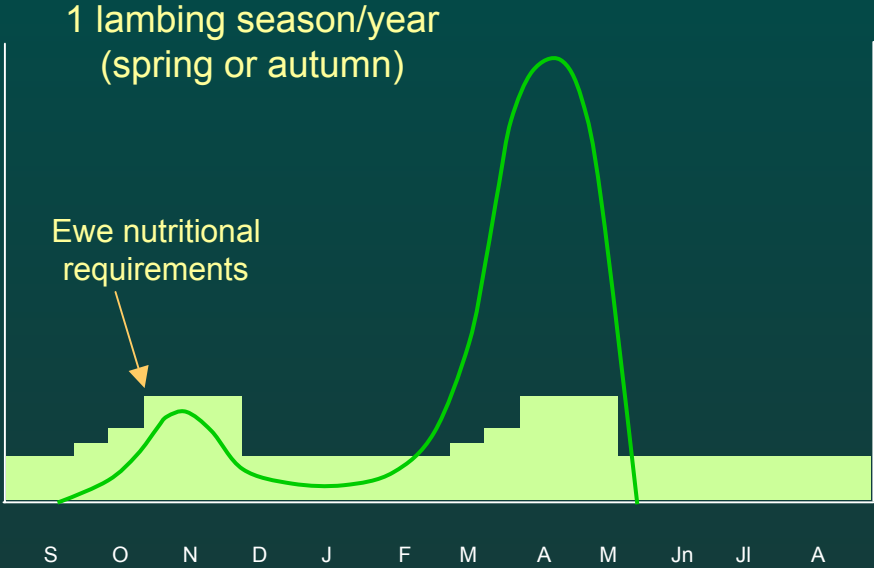


*Sheep is the most suitable livestock species for the dehesa system: it is a good walker and a selective grazer, able to feed on short grasses. The emblematic breed is the merino sheep, once an exceedingly appreciated resource for its high quality wool. Today, it provides lambs (milk for traditional cheese). There are also improved breeds: merino precoz, Fleischschaf, Landschaf, Ille de France,...*

Sheep raising systems at the dehesa

Extensive  
(less or no supplementary feeding)

Intensive (not in stocking rates)  
(more supplementary feeding)



Stocking rate: 2 - 4 ind/ha



## LIVESTOCK SPECIES. CATTLE



Retinta

*Autochthonous cattle breeds were used as labor animals. Today, they are used for extensive meat production, since they do not need shepherds. However, supplementary feeding is necessary*

*Cattle is an oportunist feeder and may browse with intensity, even young trees*



Morucha

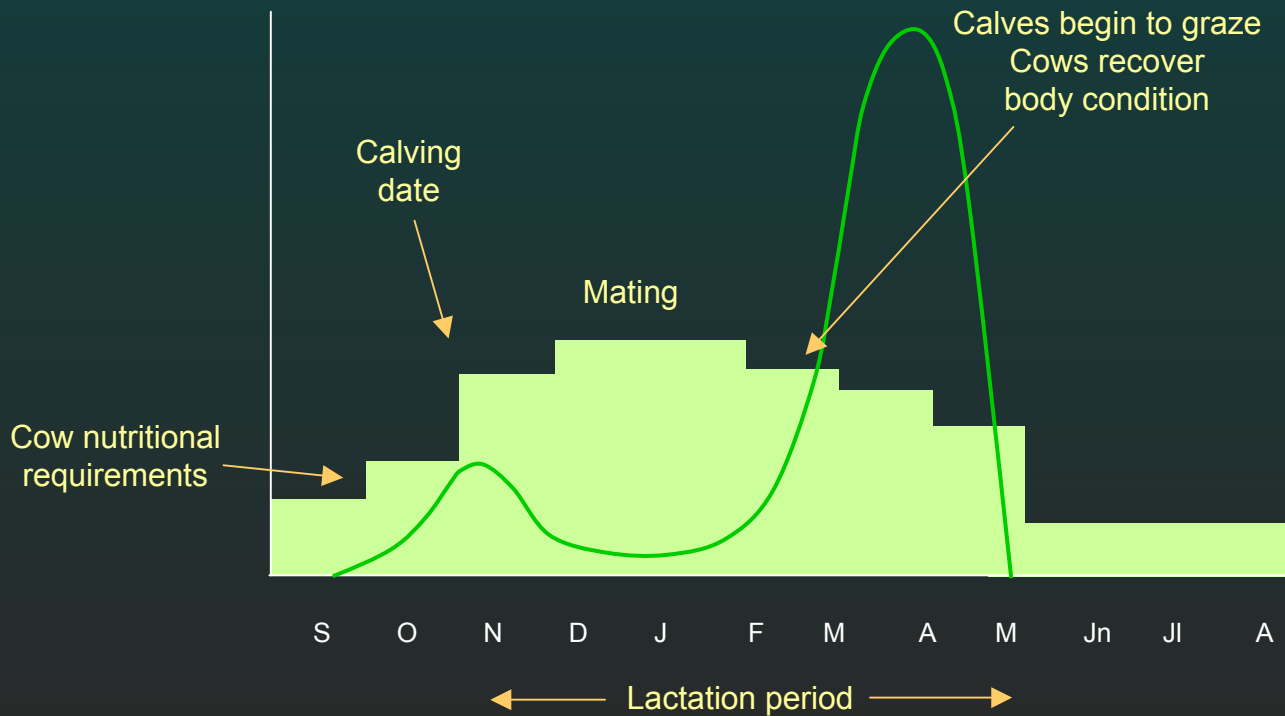


Avileña negra ibérica



# Cattle raising system at the dehesa

Stocking rate: 0.2 – 0.4 ind/ha

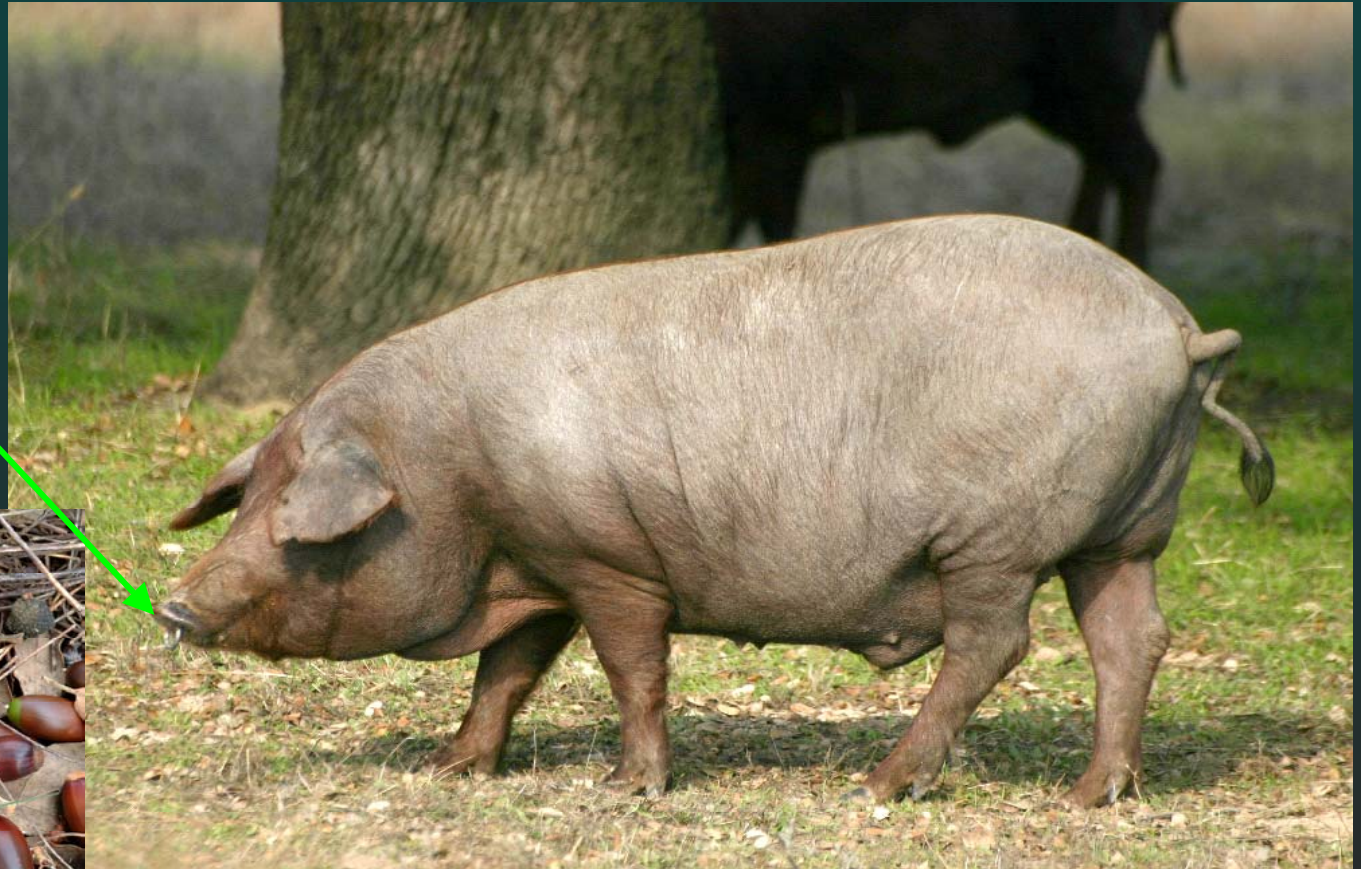


Data from  
C. López-Carrasco  
(Dehesón del Encinar)

## LIVESTOCK SPECIES. SWINE

*Iberian pig (industrial cross with Duroc Jersey) is the most suitable breed. During the final part of its life, the acorn-fall season (October-January), it feeds on acorns and grass to produce a top-quality meat. Therefore, during that season it must have priority for feeding on acorns over every other livestock species*

Stocking rate:  
0.4 – 0.6 ind/ha



Metal ring aimed at avoiding damages on the soil



## OTHER LIVESTOCK SPECIES



**Spanish Goat**



**Cachemir Goat**



**Donkey**



**Spanish horse**

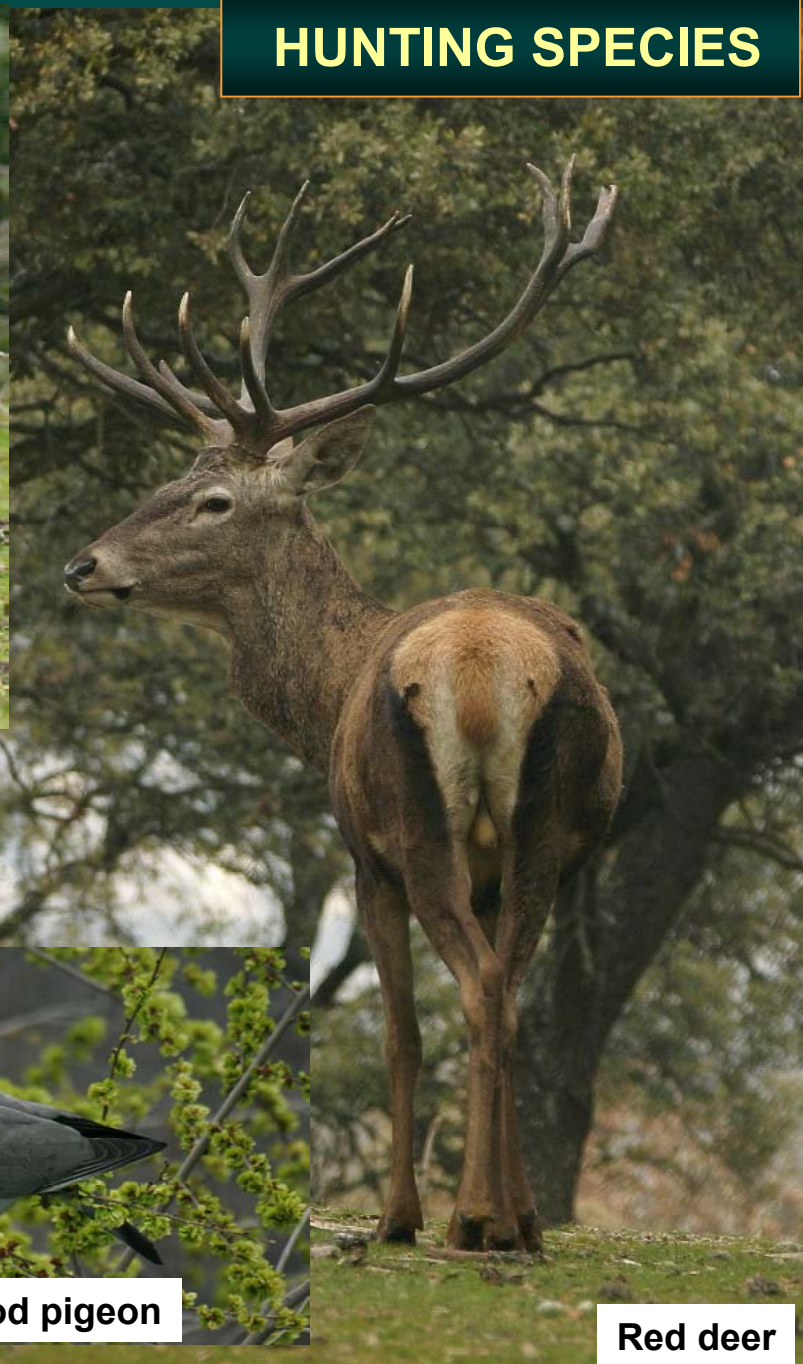
# HUNTING SPECIES



Rabbit



Wild Boar



Red deer



Red legged partridge



Wood pigeon

# ENVIRONMENTAL QUALITY

- The dehesa is not a mere productive system. It is also a highly diverse and valuable ecosystem.
- The dehesa provides a wide variety of services, or environmental benefits: stability, landscape, tourism, cultural heritage,...
- The dehesa is the habitat of many endangered plant and animal species and communities.
- That is why the dehesa has been included, as a protected habitat, in the 92/43/EEC Habitat Directive, and therefore in the Nature 2000 network
- Traditional (extensive, integrated, efficient) management is not just a tool for producing resources. It is also (and more and more each day) a powerful conservation tool
- Special care must be taken with soil, as it is the less renewable resource of the ecosystem, and crown coverage

# ENDANGERED ANIMAL SPECIES



Iberian Imperial eagle



Iberian Lynx



Cabrera's vole



Black vulture



Crane



Black stork