



# Microhistological analysis of the equine diet in the Garraf Natural Park to determine the effect of grazing on fire prevention

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## Introduction

As a result of intensive agriculture and the abandonment of forests due to overprotection and low profitability, easily ignitable material accumulates in forest and scrub areas, increasing the risk of fires and the speed with which they spread. The **Garraf Natural Park** has suffered many fires in the past, so it has been decided to introduce a herd of horses in order to eliminate the so-called fine fuel through grazing and thus reduce the risk and severity of fires to protect the ecosystem.



Figure 1. Location of the Garraf Natural Park. Source: Diputació de Barcelona.



Figure 2: Horse in the Garraf Natural Park. Source: Rosa Galindo.

## Objectives

- **Analyze**, using the microhistology technique, **the diet ingested by equines** during spring and summer.
- **Calculate the selection index** from the epidermis count and plant availability in the area.
- **Make a proposal to optimize grazing** in the area and thus increase the impact on fire prevention.

## Material and Methods

1. To determine the diet of the horses, **5 fecal samples** were taken in spring (May) in the grazing area of finca Mas Vendrell and in summer (September) in the area of finca de Pelagons. They were dried and subsequently digested with **nitric acid** and bleached with NaClO (lye).
2. Three slides per sample were prepared and analyzed with **x10** and **x40** objectives to identify **epidermal particles by cell shape and arrangement and characteristic stomata and trichomes**.
3. From the data obtained, through the **Ivlev Index**, the selection index of each species was calculated, differentiating between species that were **preferred, rejected and consumed according to availability**.

## RESULTS

## Discussion

Among the important **woody species** for fire prevention, horses positively selected *Phillyrea angustifolia* and *Cistus albidus*, but other important species, such as *Pinus halepensis*, *Quercus coccifera* and *Rosmarinus officinalis*, were rejected.

During the spring months, there was a selection according to availability of the most abundant **grass species**, *Ampelodesmos mauritanica*, which occupies 36% of the plant cover. During the summer months there was a positive selection of the two most abundant grass species in the field, *Ampelodesmos mauritanica* and *Brachypodium retusum*, which make up 10 and 11% of the vegetation cover, respectively.

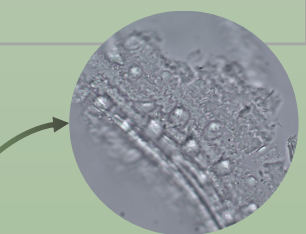
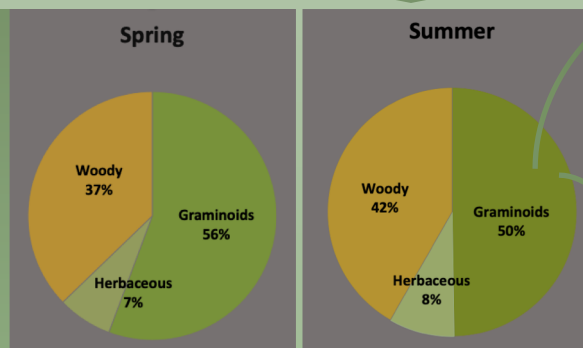


Figure 3: Epidermal fragment of *Brachypodium retusum* with x 400 magnification.

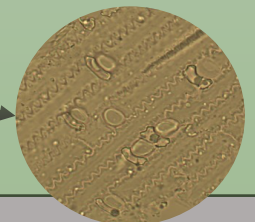


Figure 4: Epidermal fragment of *Ampelodesmos mauritanica* with x 400 magnification.

## Conclusions

Horses are useful for removing large amounts of tall grasses, such as *Ampelodesmos mauritanica* and *Brachypodium retusum*, which are considered fine fuels that frequently start fires. Besides, they have an added trampling effect that destroys a good part of the vegetation. In order to increase the elimination of woody plants, it would be advisable to combine grazing of horses with a ruminant species, preferably goats, since their dietary preferences could complement those of horses very well.