

COMPARISON OF THE WINTER AND SPRING DIET OF FREE-RANGING HORSES IN MEDITERRANEAN WOODLANDS: IMPLICATIONS FOR WILDFIRE MANAGEMENT

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INTRODUCTION

In Mediterranean landscapes, the abandonment of traditional land use and the decline of grazing have resulted in the expansion of secondary forests and substantial biomass accumulation. Extensive grazing is increasingly recognized as a natural strategy to manage this biomass and reduce wildfire risk. **Forest Horses**, a non-profit organization, employs semi-free-ranging domestic horses to restore ecosystems and help mitigate wildfires.

MATERIAL AND METHODS

The study was conducted in **Sant Joan de Mediona, Barcelona**, on a 16.46-hectare enclosed estate inhabited by 4 horses. Feces and plant samples were analyzed following a microhistological analysis protocol.



Figure 1.
Microhistological preparation
Source: Own elaboration

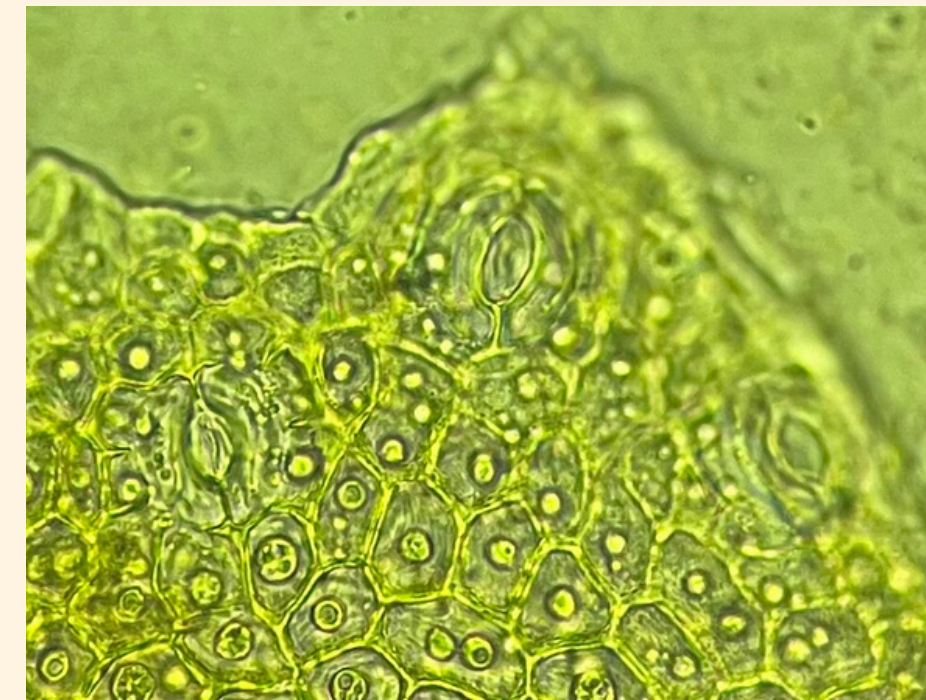


Figure 2.
Stomata of *Pistacia lentiscus*
Source: Own elaboration

RESULTS

The percentage of fragments corresponding to each plant species consumed by each horse during both periods was calculated, followed by the application of the **Kulczynski Similarity Index (KSI)**. High dietary variability was observed between individual horses in winter and spring. The seasonal average diets also differed notably (SIK = 41.88), indicating low similarity between winter and spring consumption patterns.

Table 2.
KSI of the four horses in winter

SIK winter	Horse 2	Horse 3	Horse 4
Horse 1	42	38.5	39.5
Horse 2	-	38	45
Horse 3	-	-	37.5

Source: Own elaboration

Table 3.
KSI of the four horses in spring

SIK spring	Horse 6	Horse 7	Horse 8
Horse 5	43	37	41.5
Horse 6	-	43	44.5
Horse 7	-	-	43.5

Source: Own elaboration

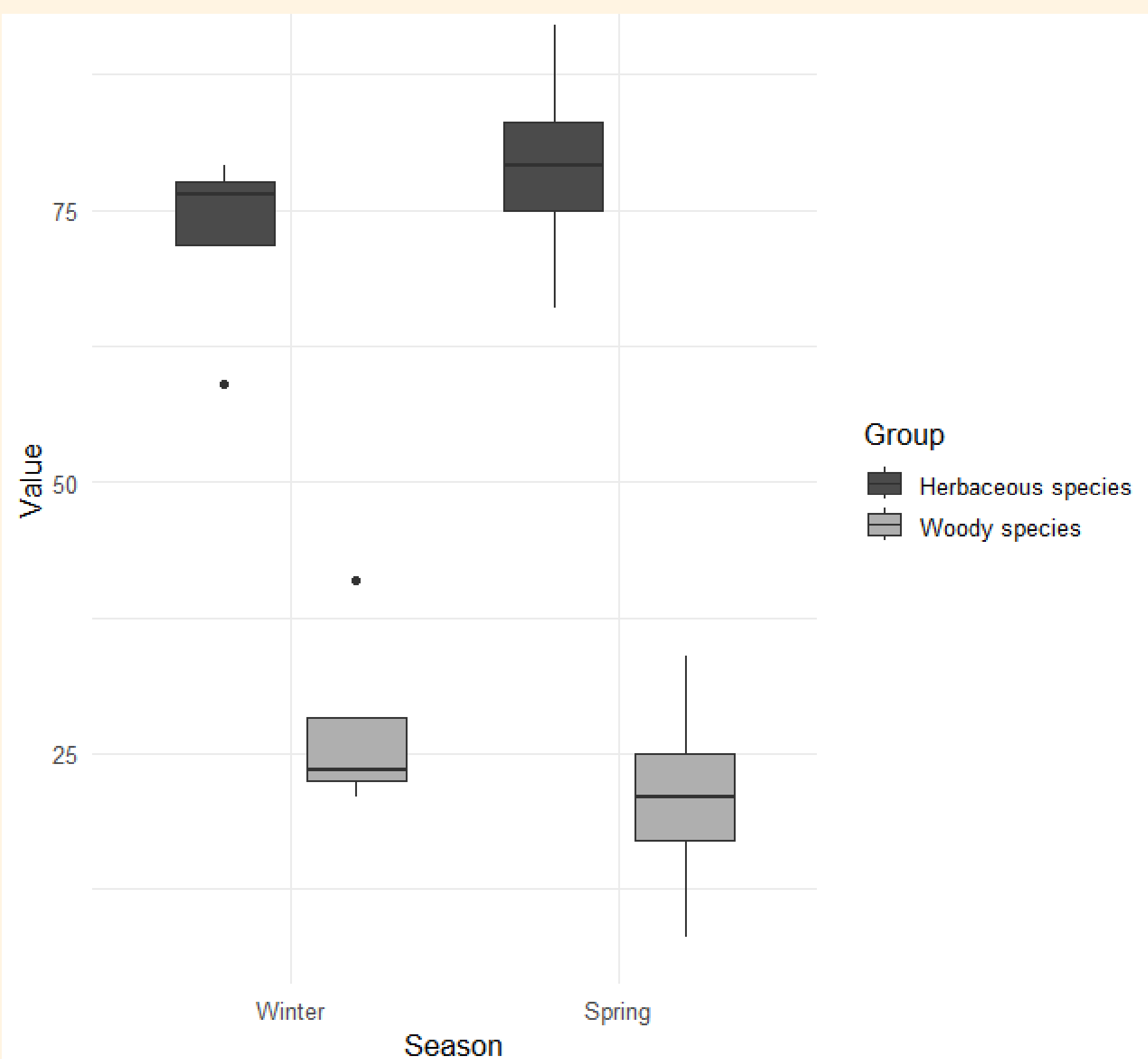


Figure 4.
Boxplot of herbaceous and woody vegetation by season

Source: Own elaboration

OBJECTIVES

The main objective of the study is to identify the understory plant species that are part of the horses' diet during the winter and spring periods, provide an interpretation of the results obtained, and establish a connection with wildfire prevention.

Table 1.

Percentage of plant fragments per horse for each season

SEASON	Winter	Winter	Winter	Winter	Winter average	Spring	Spring	Spring	Spring	Spring average
HORSE	1	2	3	4	-	5	6	7	8	-
<i>Smilax aspera</i>	0	7	8	6	5.25	1	0	0	0	0.25
<i>Erica multiflora</i>	1	0	2	0	0.75	1	0	0	0	0.25
<i>Carex sp.</i>	4	0	0	3	1.75	0	0	0	0	0
<i>Pistacia lentiscus</i>	2	1	1	1	1.25	0	0	0	1	0.25
<i>Phillyrea media</i>	2	0	3	0	1.25	0	1	0	0	0.25
<i>Salvia rosmarinus</i>	4	0	1	0	1.25	3	4	1	0	2
<i>Plantago sp.</i>	1	0	3	0	1	0	0	2	0	0.5
<i>Quercus ilex</i>	2	2	5	5	3.5	12	6	3	13	8.5
<i>Asparagus acutifolius</i>	0	0	1	0	0.25	0	0	0	0	0
<i>Olea europaea</i>	0	1	0	3	1	0	0	0	0	0
<i>Pinus halepensis</i>	0	0	1	2	0.75	0	0	0	0	0
Woody species unidentified	13	10	19	6	12	17	11	4	6	9.5
Grasses	50	50	42	46	47	44	44	49	43	45
Herbaceous species unidentified	21	29	14	28	23	22	34	41	37	33.5

Source: Own elaboration



Figure 3. Study horses grazing in the undergrowth

Source: Own elaboration

Dietary data were grouped into **herbaceous and woody species for both winter and spring**. A **Shapiro-Wilk test** was conducted to assess normality, showing that winter data were not normally distributed ($p < 0.05$), while spring data followed a normal distribution ($p > 0.05$). A **Mann-Whitney U test** was then performed, indicating no significant differences between seasons in the proportion of woody ($U = 12.0$, $p = 0.3429$) or herbaceous species ($U = 4.0$, $p = 0.3429$) consumed.

Finally, **all herbaceous and woody plant data (from both seasons) were considered together**, and a **Shapiro-Wilk test** was performed, and the data followed a normal distribution. Then, the **Student's t-test** was used (t -statistic = 10.54; p -value = 4.85×10^{-8}) indicating statistically significant differences.

CONCLUSIONS

- Forest Horses show a **FLEXIBLE AND ADAPTIVE DIET**, varying between individuals and seasons. They adjust their intake based on seasonal plant availability, mainly consuming herbaceous species due to their physiology and abundance in the environment.
- This feeding behavior **SUPPORTS THEIR SURVIVAL** in changing conditions and **HELPS MANAGE ECOSYSTEMS** by reducing plant biomass and wildfire risk. Increasing their numbers could enhance these ecological benefits.
- Long-term studies are needed to better understand seasonal diet changes and improve their role in fire prevention.