

**EVALUATING THE PALAEOECOLOGICAL POTENTIAL OF WETLAND DEPOSITS
IN AN UPLAND AREA (SERRA DO GERÊS), NORTHWEST PORTUGAL**

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Introduction

Restoration of biodiversity and ecosystems is fundamental in controlling climate change and mitigating damaging impacts of land-use (Strassburg et al., 2020). By looking into the past, palaeoecology provides an important context which allows comparing and contrasting past landscapes and ecosystems with present ones. The climate crisis we presently face brings several challenges and sensitive areas are impacted more severely. In Europe, upland landscapes are a specific type of landscape that has evolved in a long-term relationship with human communities. In spite of the long story of settlement, today these regions are often considered to be peripheral (Cavaco, 2005). That very same peripherality that contributed to the development of specific environments now threatens them, in the form of population exodus, extinction of the traditional way of life, of climate change and its impacts, exposing the fragility of these landscapes (Honrado et al, 2016). Driven by climate change, shifts in land-uses resulting from land abandonment and/or commercial forestry can have catastrophic consequences not least by increasing ecosystems vulnerability to wildfires.

Rational

If we can understand the different past ecological processes which supported the existence and maintenance of robust ecosystems perhaps these can be restored/maintained in the present. Equally fundamental is to comprehend how climate and humans influenced and shaped past processes, past dynamics and their respective roles as drivers of change. Change and disturbance are an integral part of natural ecosystems. To understand how human activities in the past related to these cycles could be fundamental to addressing the challenges faced in the present (Connor et al. 2019). It is therefore necessary that analysis of Holocene change in Europeans

uplands must consider anthropic drivers. Furthermore, we need to understand, at the local scale, the past dynamics of a landscape and their drivers to be able to make logical management decisions.

Location and Methods

The study area is located in the Terras de Bouro Municipality, NW Portugal. Sampling locations are situated within the Gerês mountain and border the Parque Nacional Peneda Geres.



Figure 1. Study area location.

The aim is the establishment of a skeleton multiproxy palaeoecological sequence, enabling the evaluation of these deposits potential to contribute to the



Figure 2. Castro da Calcedonia (July 2023).

vegetation history, patterns of landscape change and land-use in this area. Following on from the results of surface sample analysis from collected in 2021 at the Castro da Calcedonia (Sá Ferreira, 2022) the proposed work in 2023 was to collect a sediment core from this location to establish the viability of the palaeoecological record. Unfortunately, at the time of sampling (July 2023) the site was completely dry and it was not possible recover a sediment core.

A survey was then carried in the surrounding areas to locate suitable sampling locations in the vicinity and in direct relation to the path of the Via XVIII. Two

locations were identified, and sediment cores were retrieved using a Russian corer. Surface samples were also collected to establish pollen source area. The cores were subsampled for palaeoecological analysis and ^{14}C dating. Samples for palaeoecological analysis were processed at National University Ireland Galway using standard laboratory techniques as per Faegri and Iversen (1989) and Moore et al. (1991). Chã de Vilar pollen percentages were calculated and plotted in Excel. Campo do Gerês data percentages were calculated and plotted using Tilia (Grimm, 2011).



Figure 3.
Sampling at
Chã de Vilar.

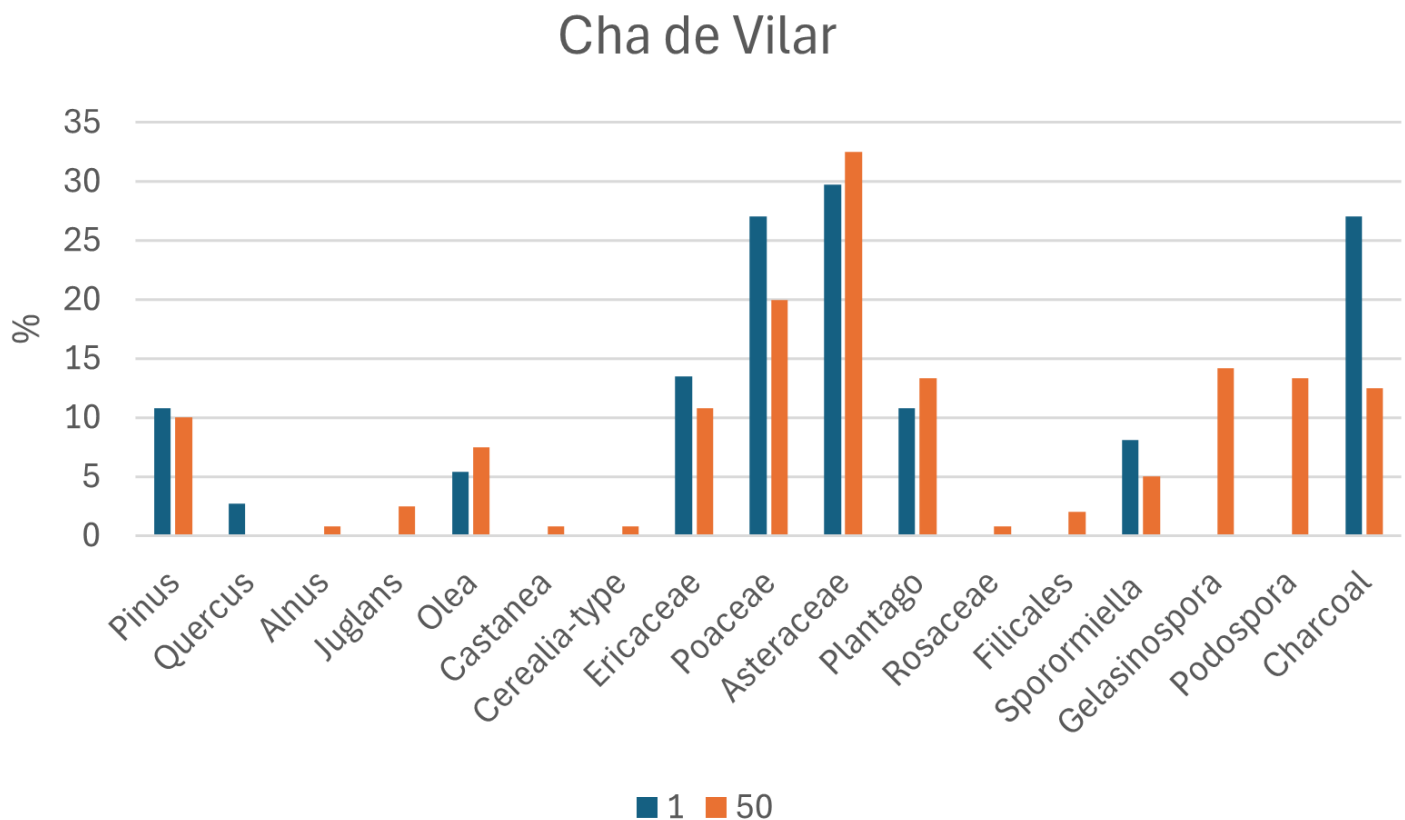


Figure 4. Chã de Vilar pollen percentages at 1cm and 5cm.

Sites

The Chã de Vilar site (41°42'19.8"N 8°17'33.1"W) is located in a small accumulation basin at the base of a gentle slope. The surrounding vegetation is composed of shrubs (*Ericaceae* and *Ulex* spp.) and ferns, mainly *Pteridium aquilinum*. A 50cm sediment core was collected at this site. It is possible that this deposit is deeper than the depth cored as the surface was compacted and was challenging to operate the Russian corer in order to maintain its integrity (Fig.3).

This site is located at the start of the mile *XVIII* of the Roman Road *XVIII -Bracara Augusta* to *Asturica Augusta*. It corresponds to the area of a Roman settlement with some authors suggesting that this might be the location of the *Mansio Salaniana* mentioned in the Antonine Itinerary (Fontes et al, 2020). Owing to the shortness of the sedimentary profile only two samples were analysed for this site and results are presented in a graphic (Fig.4).

The sediment was very minerogenic and the analysed pollen was mostly degraded possibly due to



Figure 5. Campo do Gerês deposit.

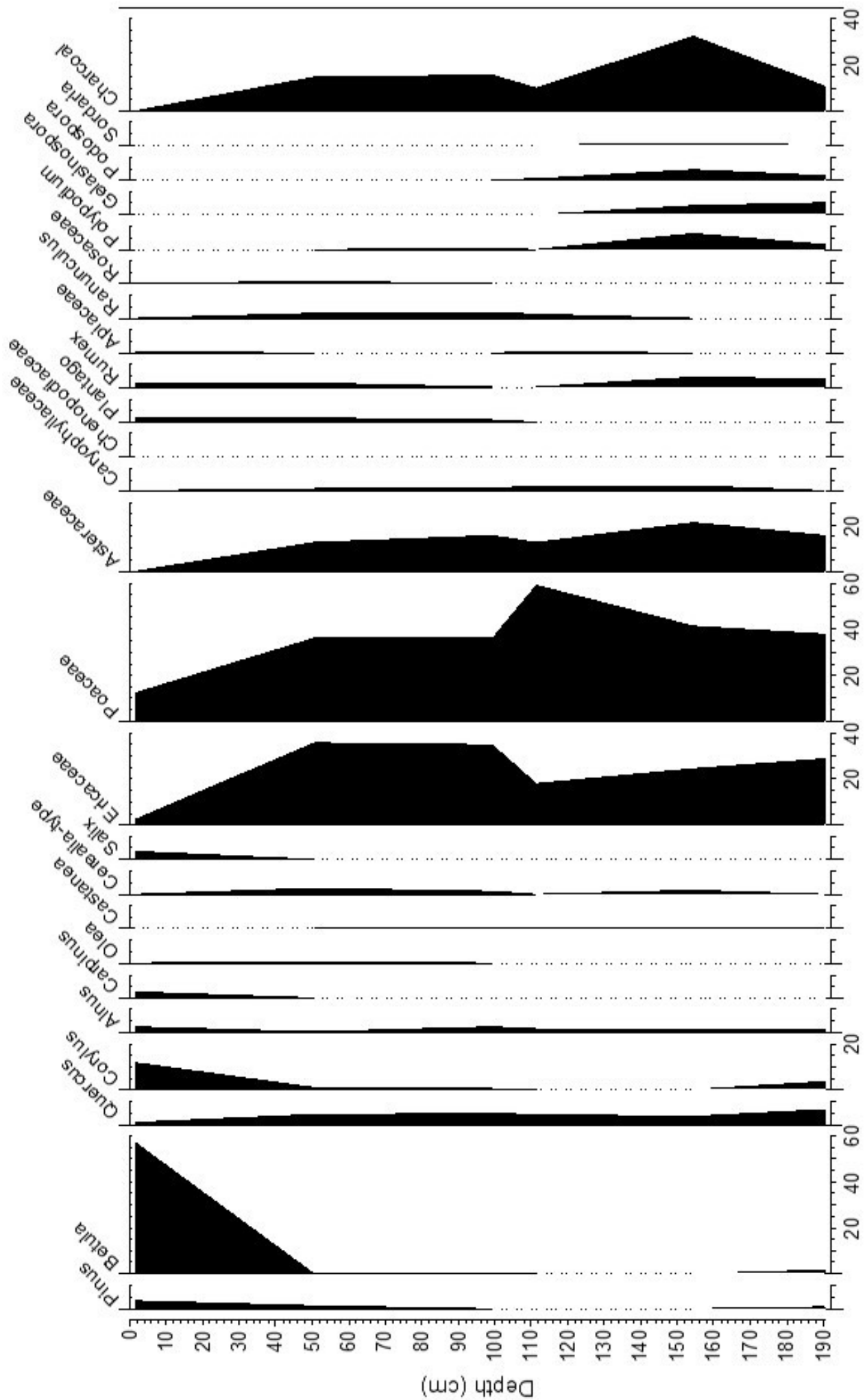


Figure 6. Campo do Gerês multiproxy diagram.

taphonomic processes. Cultivars are present in both the surface and 50cm samples although only *Olea* is present in the former. This suggests that the Relevant Pollen Area is probably located to the West/Southwest of the deposit and includes the Casal village area, 700 meters from the sampling site. Coprophilous fungi were more abundant at 50cm than at present with only *Sporormiella* spp. recorded in the top sample. There is cattle grazing in the area and a small herd was grazing the site when sampling was conducted. The samples do not suggest any significant landscape variation between 50cm and the present-day surface. This could indicate that sediment accumulation at the site is quite fast due to erosion, and the base of the column is chronologically close to the present day. Or could suggest that, due to the compaction of the soil, the deposit could yield a deeper sediment sequence if a different corer is used, or work takes place at a different time of the year.

Campo do Gerês

The Campo do Gerês deposit is located in a small hollow close to a small stream (41°44'56.9"N 8°12'11.2"W) and it is surrounded by small trees and shrubs namely birch (*Betula* spp.), alder (*Alnus* spp.) and willow (*Salix* spp.).

A 190cm sediment sequence was collected here (Fig.5). This site is in close articulation to the *Via XVIII*, c. 500m to the West, the Sagrado roman settlement 1km to NE, and Mata da Albergaria 2km also to NE. The existing local vegetation is well represented in the surface sample although *Pinus* and cultivars must originate from the Pollen Source Area probably on the North/Northeast where the present-day settlements are located.

Cultivation is recorded throughout the sequence with arable crops being prevalent between 100cm and 10cm. Mid sequence (~100cm) there is a shift from the dominance of Poaceae to Ericaceae which appears to coincide with the rise in *Cerealia*-type and the contraction of coprophilous fungi. It could indicate an abandonment of grazing areas in the locality and a move towards a more specialised form of farming.

Conclusions

Even though data is limited both sites show potential to yield information on the vegetation dynamics and landscape change in this region. This is extremely significant considering the scarcity of palaeoecological studies in northern Portugal. These could contribute to elucidate long-term vegetation shifts and their drivers,

providing crucial data to inform present and future land management policies. Funding will be sought to date the beginning of accumulation at both locations and further survey and sampling will be undertaken in the region to locate new wetland areas and evaluate their potential for future palaeoecological studies.

Acknowledgments

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References

- Cavaco (2005). Especificidade da montanha exige maior comprometimento, in *Pessoas e Lugares*, Jornal de Animação da Rede Portuguesa LEADER+, II Série, Nº 28, pp. 2;
- Connor et al. (2019). Humans take control of fire-driven diversity changes in Mediterranean Iberia's vegetation during the mid-late Holocene. *The Holocene*, p.0959683619826652;
- Fontes, L., Alves, M., Bernardes, P., Machado, E. Baptista, A., Cosme, F. (2020). Avaliação do Estado de Conservação da Jeira no território do Concelho de Terras de Bouro;
- Fægri K, Iversen J. (1989). Textbook of pollen analysis. John Wiley & Sons: Chichester.
- Grimm, E. (2011) *Tilia 1.7.16* Illinois State Museum, Springfield
- Honrado et al. (2016). Conservation management of EU priority habitats after collapse of traditional pastoralism: navigation socioecological transitions in mountain rangeland, *Rural Sociology* 81, pp. 293-294;
- Moore PD, Webb JA, Collinson ME. (1991). Pollen Analysis. Blackwell: Oxford;
- Sá Ferreira, C. (2022). Wetland survey in northern Atlantic Portugal: northwestern area of Parque Nacional Peneda-Gerês. *Quaternary Newsletter* 157;
- Strassburg, et al. (2020). Global priority areas for ecosystem restoration, *Nature* 586, 724-729.