

Stable Isotope Analysis of the Diet of Romans and Langobards in the Veneto from Late Antiquity to the Medieval Period

INTRODUCTION

This research focuses on the cultural interactions that occurred in the Veneto, Italy after the fall of the Western Roman Empire and arrival of the Germanic Langobards in the sixth century AD. The Langobards reached the Veneto in AD 568, which triggered multiple conflicts with the native post-Roman and Byzantine populations. After the fall of the Empire, the political economy in northeastern Italy collapsed from a traditional market system to one that relied on localized resources such as fish, domesticated animals, and wheat (C₃ plant). With the Langobard arrival, historical records suggest a heavy reliance on pork, a potential increase in the production of millet (a C₄ plant), and dairy production. The impact that the Langobards had on changing economic and political structures in this area is poorly understood, as existing historical information and the archaeological record is incomplete. Thus, questions remain of the local implications of diet during this period of instability, especially regarding changes in the political economy with the arrival of the Langobards.

Research Questions: This research compares four 4th-6th century AD sites and three 7th century AD Langobard sites from the Veneto using stable isotope analysis to address the following questions:

1. What were people consuming in the Veneto after the fall of the Western Roman Empire?
2. Did dietary practices change with the arrival of the Langobards in the 7th century AD?

GEOGRAPHIC BACKGROUND

The Veneto is located in the alpine region of northeastern Italy, with Venice, its lagoon, and the Adriatic Sea to the east. All sites sampled are shown below (Fig. 1).

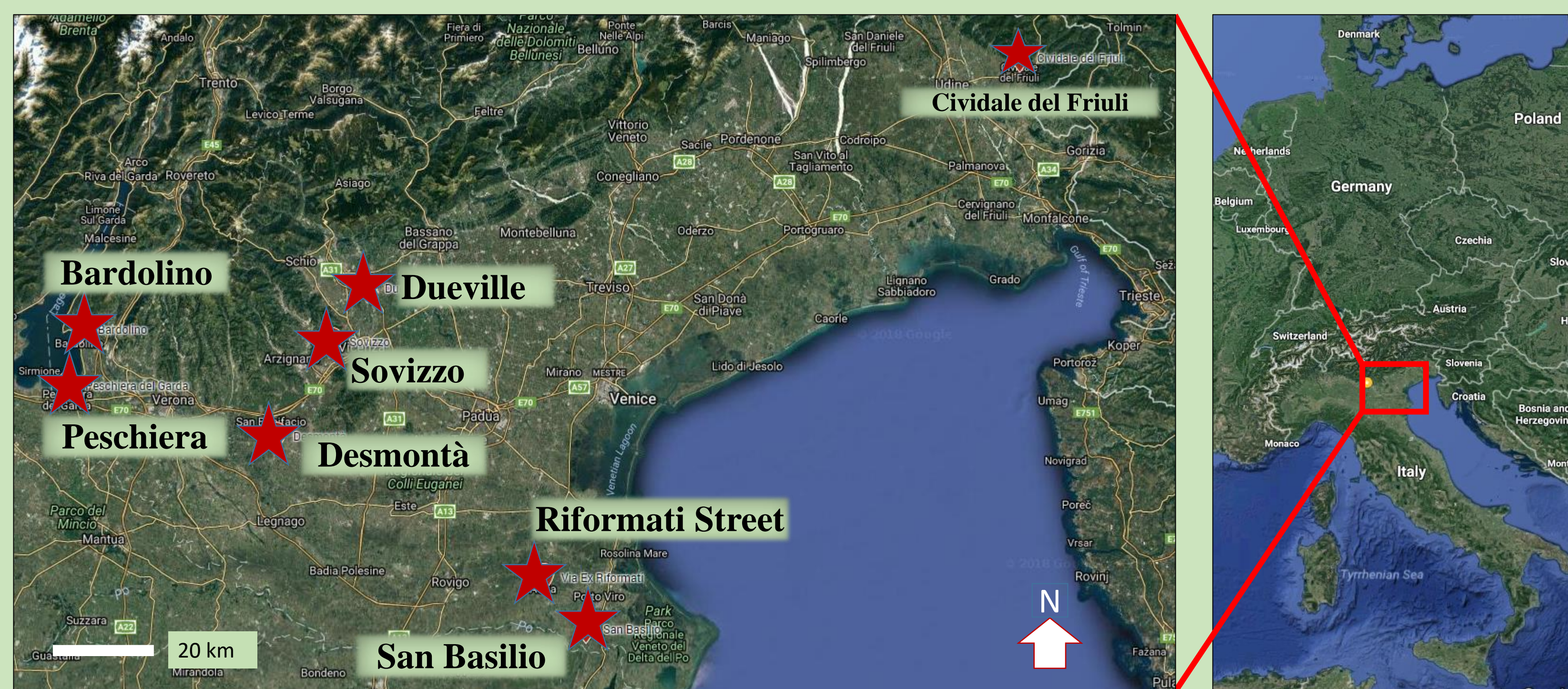


Figure 1. Map of Veneto Sites



Figure 2. Langobard Migration Route (National Archaeological Museum of Cividale)

- Historical records indicate that the Langobards arrived into the Veneto area through the Julian Alps in AD 568 (Fig. 2).
- The Veneto is the second region that the Langobards crossed after Cividale del Friuli, but it was still a part of the first wave of migrants.
- Their presence eventually led to a division of the landscape, with the Langobards' eventual settlement along the Po Valley and Lombardy.

LANGOBARD MATERIAL CULTURE

Evidence of the Langobard presence has been found in burial contexts throughout the Veneto, and include grave goods such as knives, bone combs, belt fittings, and ceramics (Figs. 3-6).



Figure 3. Sovizzo burial with long sword and boss



Figure 4. Knife

Figure 5. Bone comb

Figure 6. Ceramic pot

ISOTOPIC BACKGROUND

Carbon ($\delta^{13}C_{co}$) and nitrogen ($\delta^{15}N_{co}$) isotope values of bone collagen are used to reconstruct dietary proteins (Fig. 7), while apatite carbon isotopes ($\delta^{13}C_{ap}$) reflects the whole diet (Fig. 8).

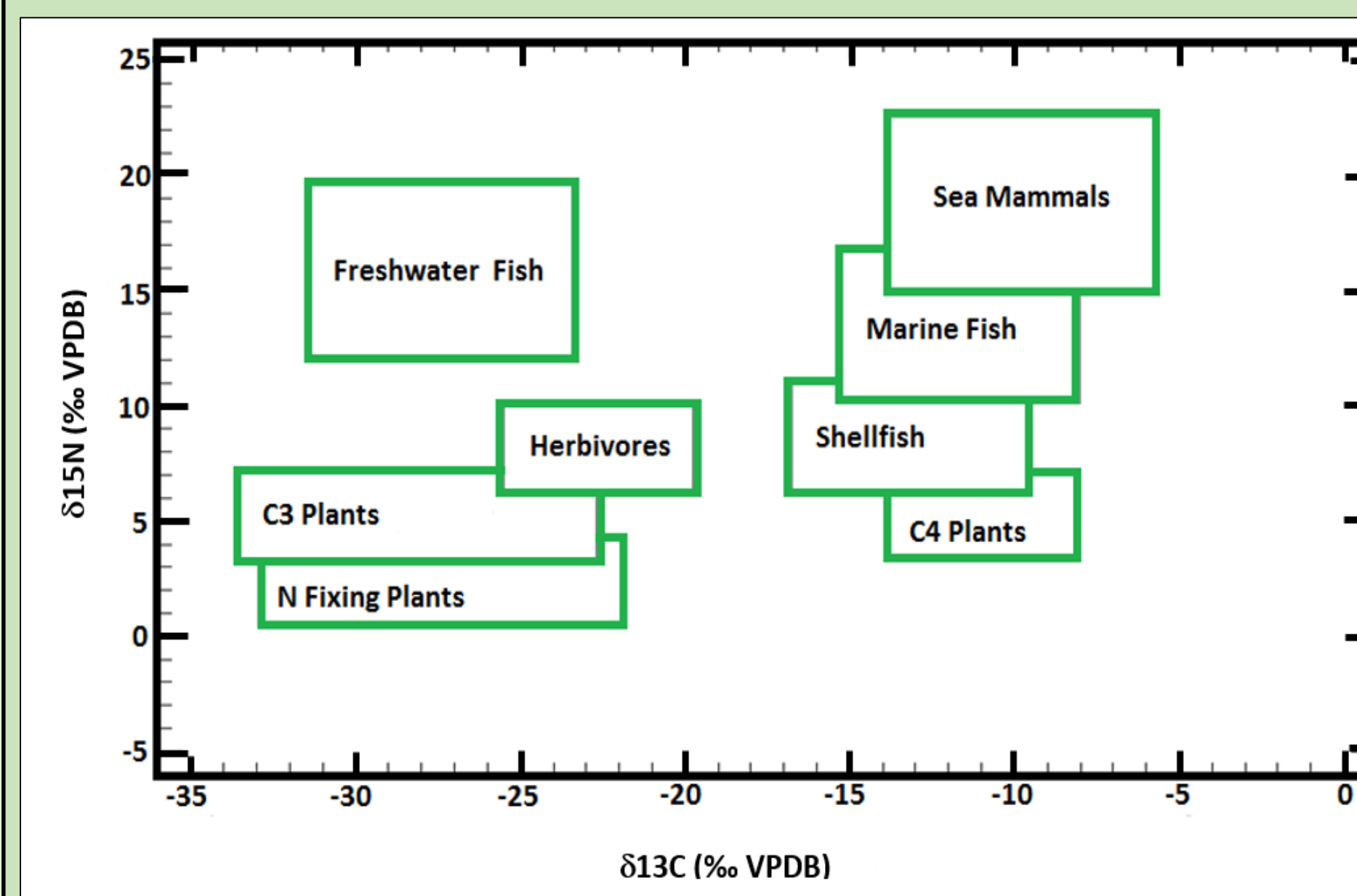


Figure 7. Carbon and nitrogen food ratios

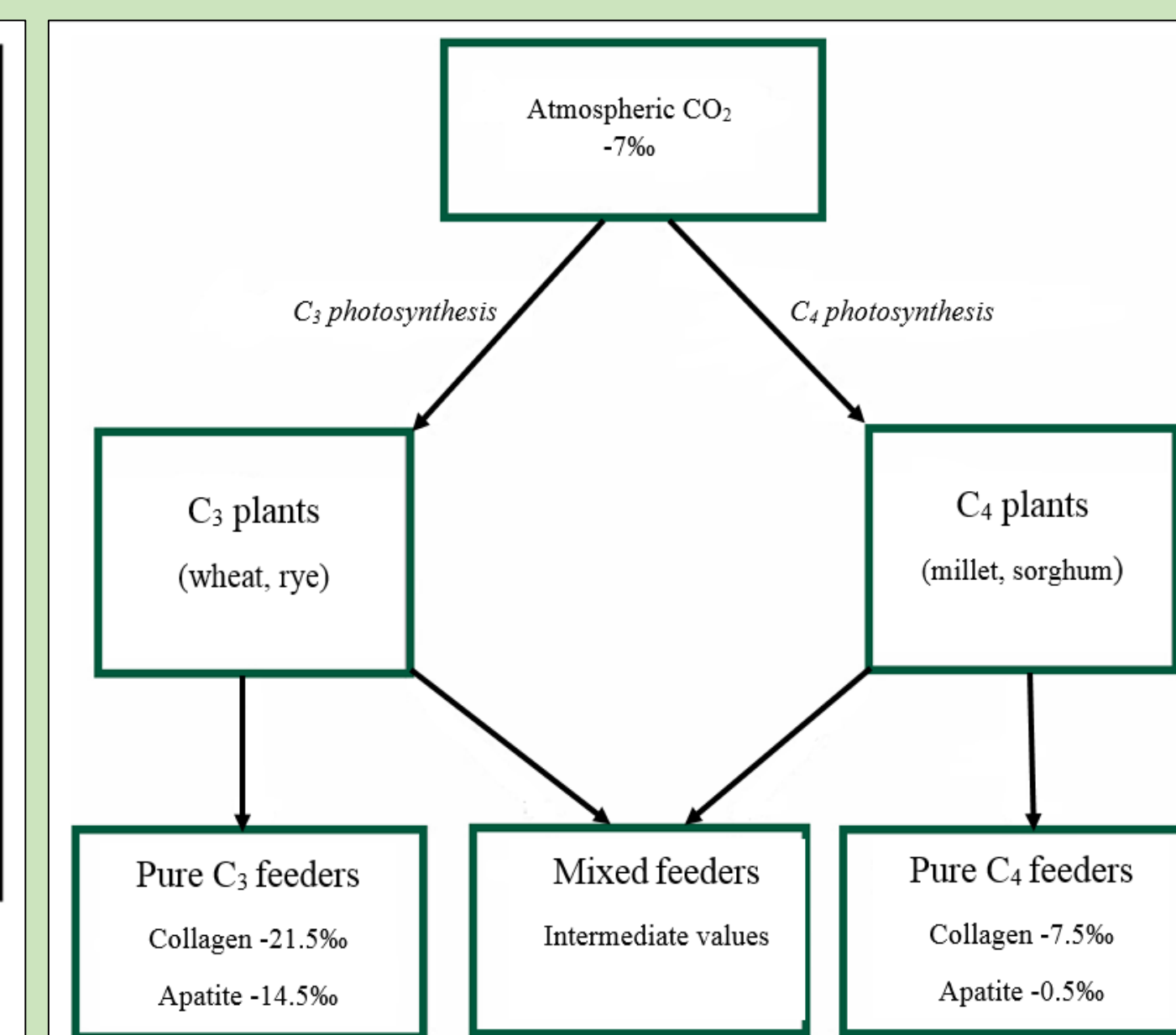


Figure 8. Carbon isotopic pathways

Carbon isotopes can distinguish between plants that use different photosynthetic pathways, such as wheat (C₃ plant), and millet (C₄ plant) (Fig. 8). Nitrogen isotopes can differentiate between protein sources, with higher values correlating with higher trophic levels (Fig. 7).

MATERIALS and METHODS

A total of 149 femoral and rib bone samples were collected from seven sites in the Veneto (Fig. 1, Table 1). Collagen and apatite pre-treatment was performed at the University of South Florida Laboratory for Archaeological Science and analyzed in the USF Paleolab (Figs. 9-12).

Table 1. Samples from the Veneto

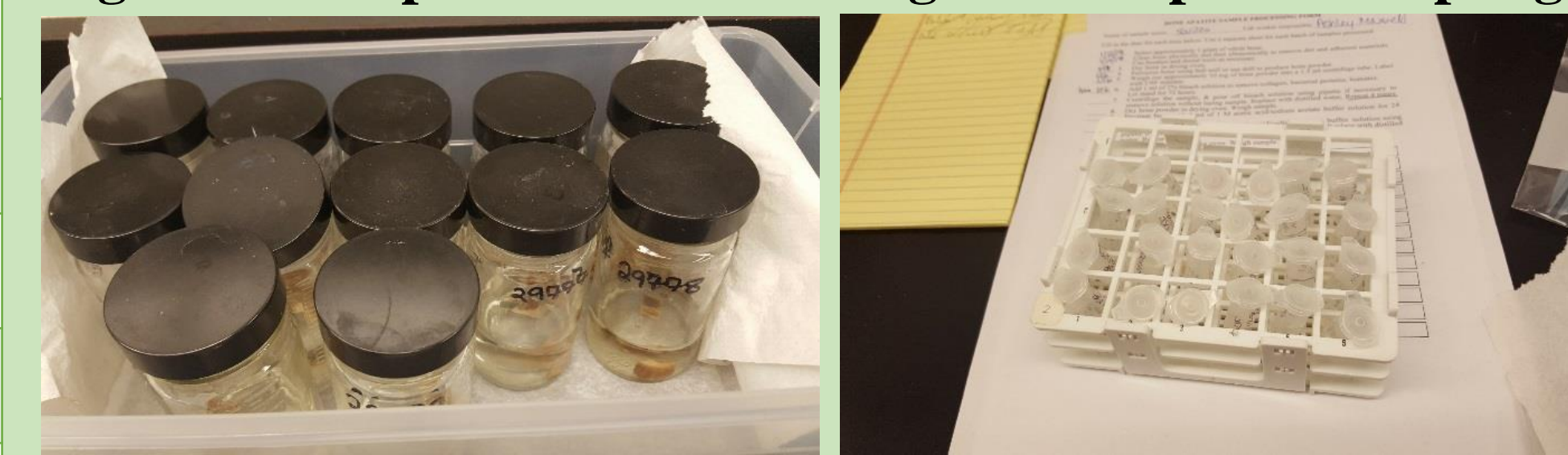
Site	Location	Period	n
San Basilio	Ariano Polesine	4th-6th century AD	24
Riformati Street	Adria	4th-6th century AD	6
Peschiera	Verona	4th-6th century AD	7
Desmontà	Verona	4th-6th century AD	6
Bardolino	Verona	7th century AD	7
Sovizzo	Vicenza	7th century AD	50
Dueville	Vicenza	7th century AD	50
Total			149



Figure 9. Sample collection



Figure 10. Apatite sampling



Figures 11 & 12. Collagen (L) and apatite (R) pre-treatment

RESULTS

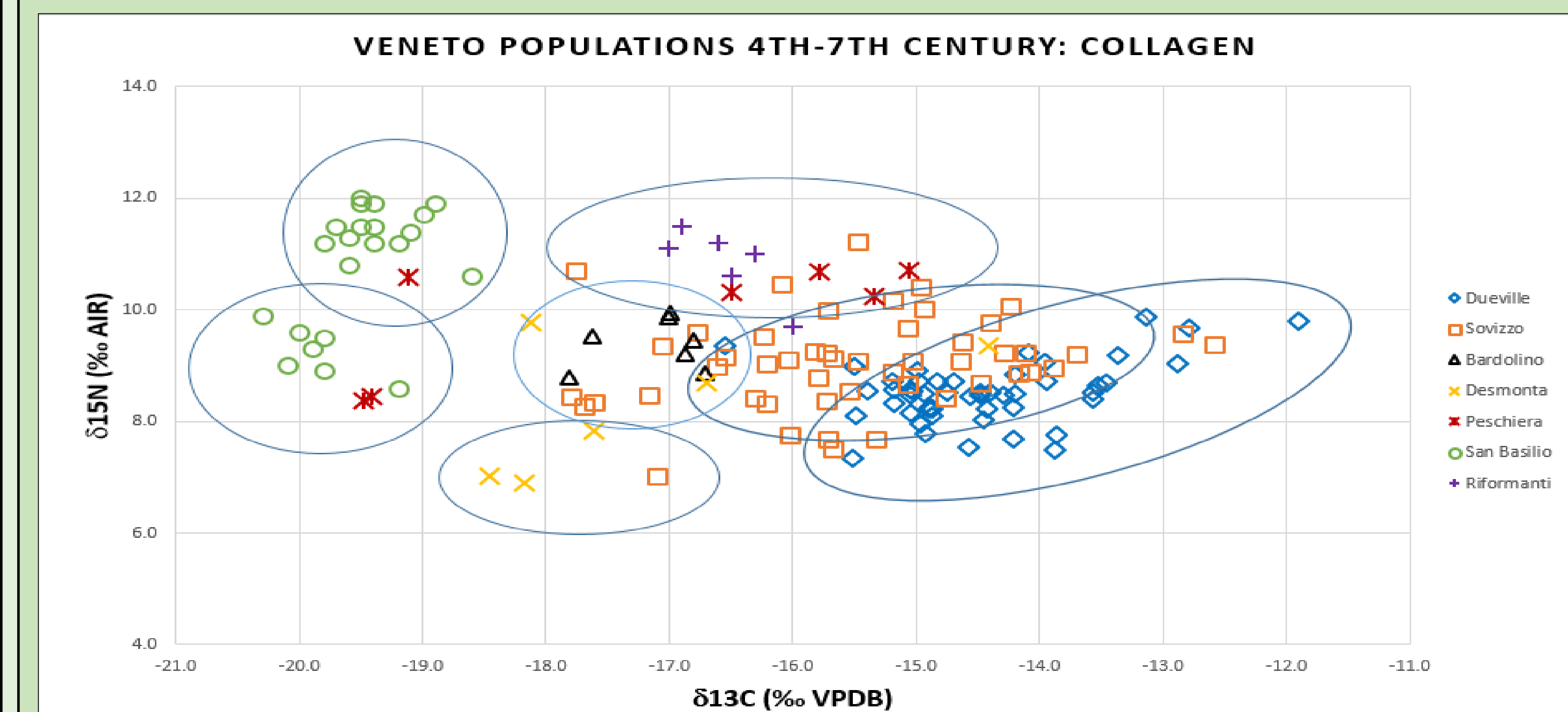


Figure 13. Carbon and nitrogen bone collagen results

- The mean collagen carbon isotope ($\delta^{13}C_{co}$) values for the 4th-6th century AD sites are -18.4‰ , indicating a predominately C₃ terrestrial diet. Mean nitrogen isotope ($\delta^{15}N_{co}$) values are 10.9‰ , indicating some fish and animal protein contributions (Fig. 13).
- The 7th century AD Langobard average $\delta^{13}C_{co}$ value is -15.1‰ , indicating a C₄ terrestrial diet (Fig. 13).

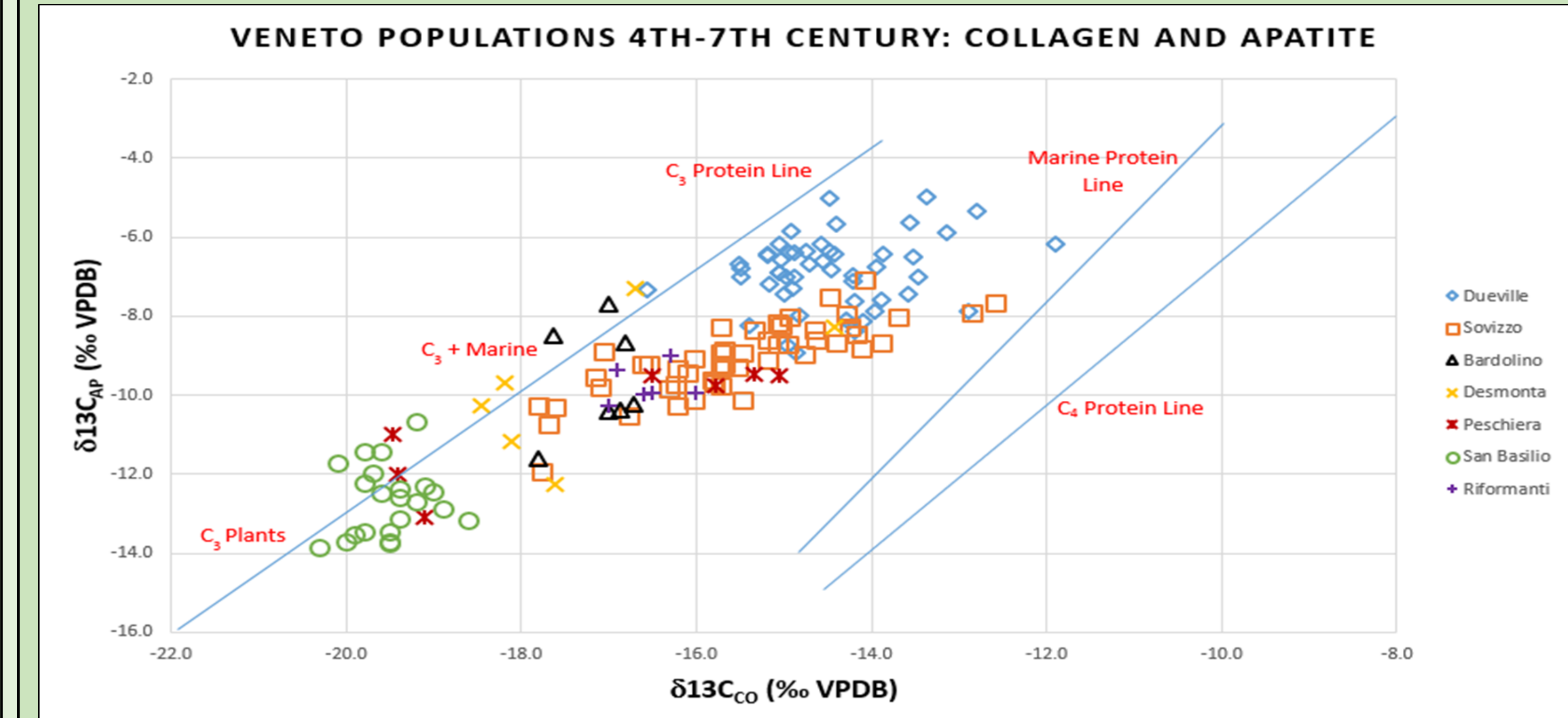


Figure 14. Carbon collagen and apatite results

- The average $\delta^{13}C_{ap}$ value for the 4-6th century AD sites is -11.4‰ , suggesting a greater consumption of C₃ plant resources (Fig. 14).
- The 7th century AD Langobard average $\delta^{13}C_{co}$ value is -8.1‰ , indicating the greater use of C₄ plant resources (Fig. 14).

DISCUSSION and CONCLUSION

This study shows that diet, after the fall of the Western Roman Empire in the Veneto, was similar to a traditional Roman diet of fish and terrestrial C₃ resources, although some individuals clearly lacked significant protein (Desmonta, Sovizzo, Dueville). Dietary practices appear to have changed with the arrival of the Langobards in the 7th century AD, which shows clear evidence of a significant contribution of C₄ resources such as millet (Sovizzo and Dueville). These results may indicate that the Langobard transition into Italy was stressful on the population, or that the individuals from Sovizzo and Dueville with high carbon values were enslaved Roman/Byzantine populations. Oxygen isotopes will be used to explore these conclusions.

REFERENCES

- Christie N. 1995. The Lombards: The ancient Longobards. Cambridge, MA: Blackwell.
- Tykot R.H. 2004. Stable isotopes and diet: you are what you eat. In: Physics Methods in Archaeometry, edited by M. Martini, M. Milazzo, and M. Piacentini, pp. 433-444. Bologna: Società Italiana di Fisica.

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