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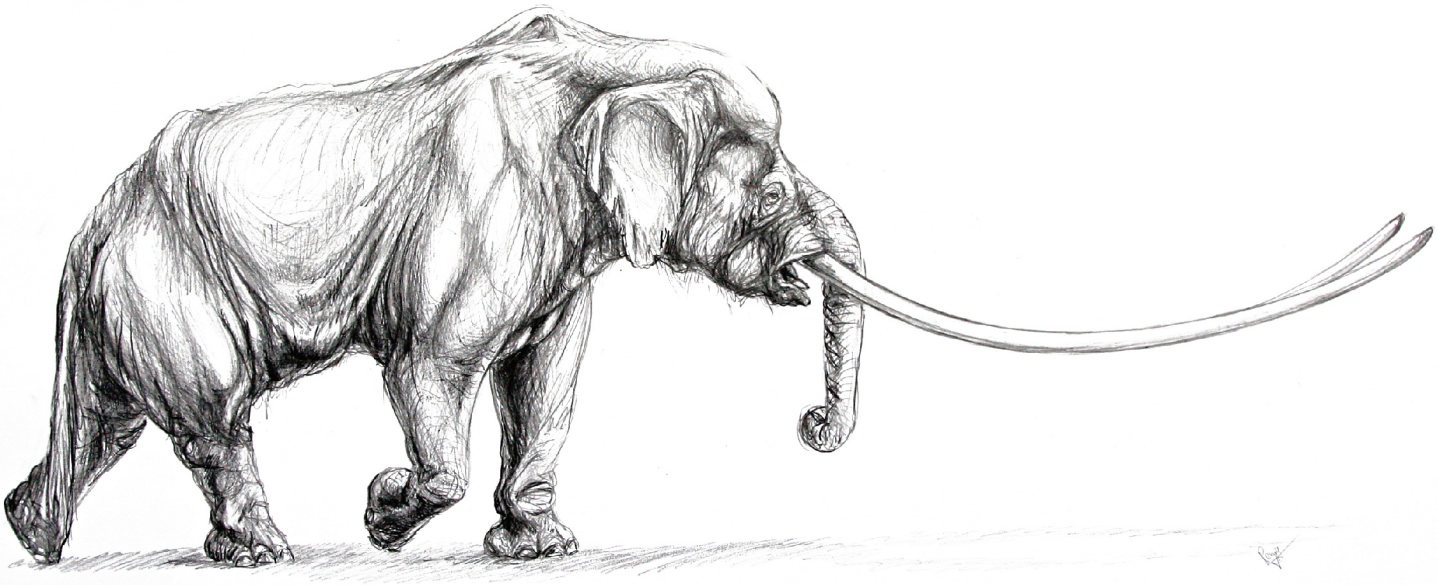

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ABSTRACT BOOK

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Dietary traits and resource partitioning in mammoth (*Mammuthus rumanus* and *Mammuthus meridionalis*) and mastodon (*Anancus arvernensis*) in the Early Pleistocene of Europe

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Ungulate tooth mesowear and microwear studies provide valuable proxies for demonstrating the existence of geographical and/or temporal variability in diet and vegetation structure (Rivals et al., 2012; Semprebon et al., 2004a; Semprebon and Rivals, 2010), but also in niche segregation and resource partitioning (Rivals et al., 2010; Rivals et al., 2008).

The objective of this study is (1) to infer the dietary traits of three proboscidean species: *Mammuthus rumanus*, *Mammuthus meridionalis*, and *Anancus arvernensis*, and (2) to investigate any resource partitioning existing between *Mammuthus* and *Anancus* when they co-occur at a locality. We collected and analyzed samples from four European localities where the two genera were present (Figure 1): Red Crag (UK, ca. 2.5 Ma), Norwich Crag (UK, ca. 2.2 Ma), Chilhac (France, ca. 2 Ma) and Oosterschelde (Netherlands, ca. 1.7 Ma).

We used dental microwear analysis to study dietary traits

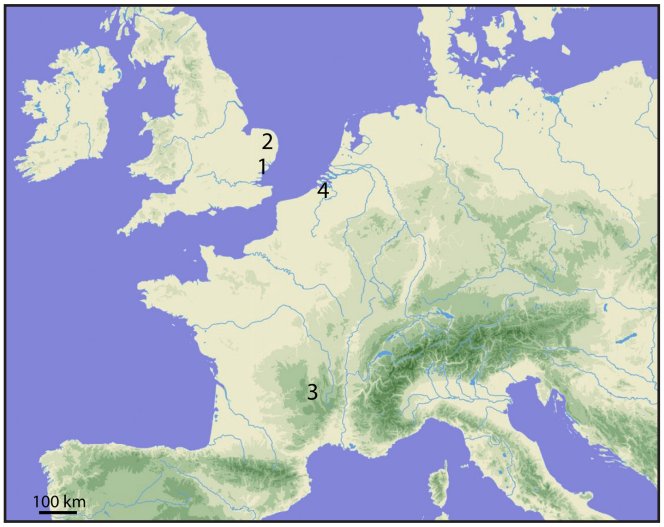

Fig. 1. Geographic position of the localities sampled: (1) Red Crag, (2) Norwich Crag, (3) Chilhac, and (4) Oosterschelde.

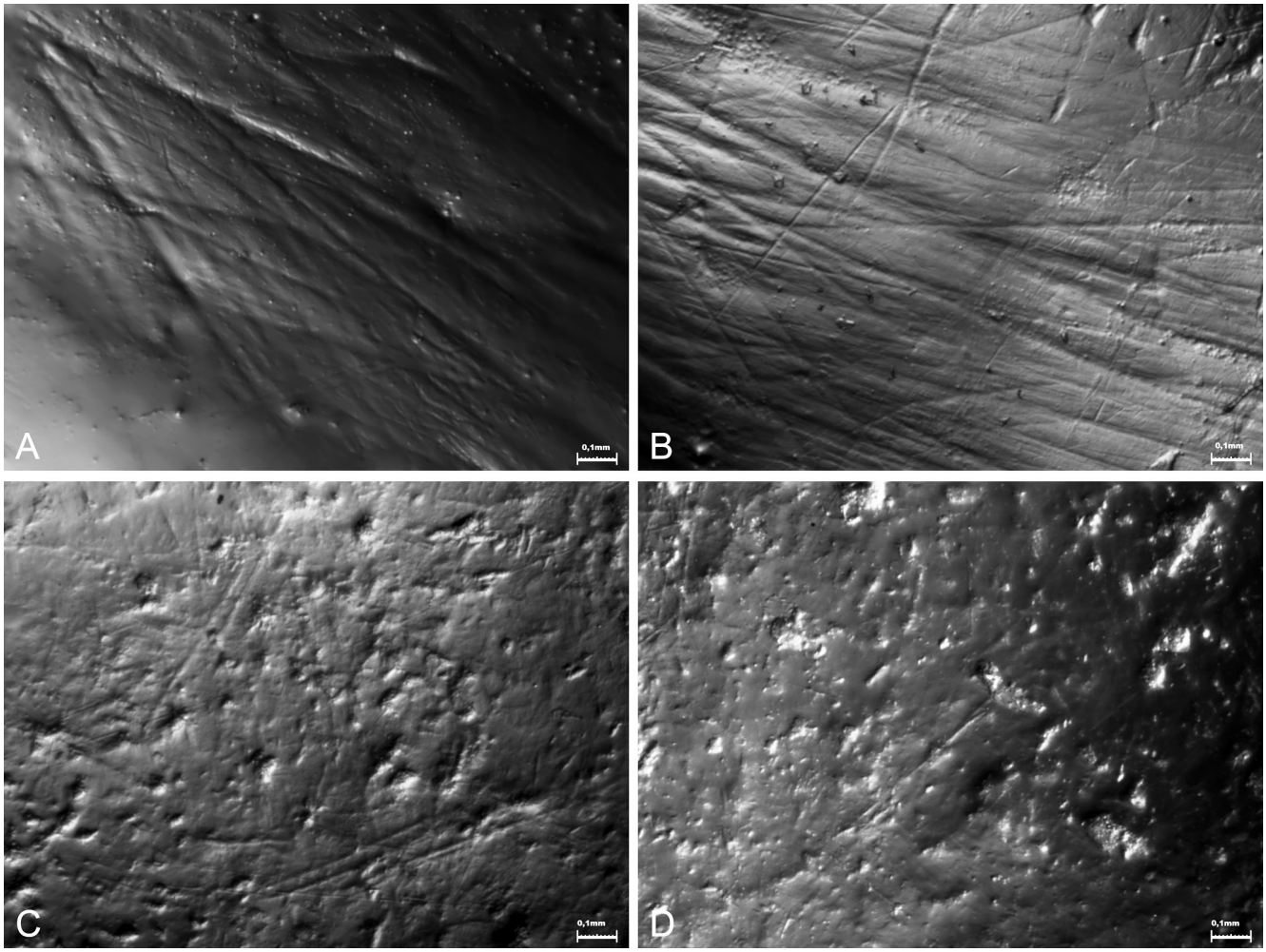

Fig. 2. Microphotographs of selected fossil proboscideans tooth enamel surfaces at 35 times magnification from Chilhac (**A** and **B**) and Red Crag (**C** and **D**). **A**, *Anancus arvernensis* from Chilhac (2011-4-65); **B**, *Mammuthus meridionalis* from Chilhac (2011-4-60); **C**, *Anancus arvernensis* from Red Crag (NHM M9141); **D**, *Mammuthus rumanus* from Red Crag (IPSMG R955-12-11). Scale bar equals 100 μm.

of *Mammuthus* and *Anancus*. Dental microwear patterns mirror the physical properties of food preferences from the last few days or weeks (Teaford and Oyen, 1989; Walker et al., 1978). The microwear analysis was performed following methods described by Solounias and Semprebon (2002) and Semprebon et al. (2004b). Tooth surfaces were cleaned and moulded using dental silicone and used to produce high resolution tooth casts. These casts were used to identify and quantify the microwear features (pits and scratches) at 35× magnification using a stereomicroscope. For the three fossil species, the analysis was made on the central enamel areas of the occlusal surface. The data were compared to a database made of extant wild ungulates, including modern elephants (Solounias and Semprebon, 2002).

The data collected on the samples from Red Crag, Norwich Crag, Chilhac, and Oosterschelde indicate that the diet of the two taxa is highly variable. For both genera, *Mammuthus* and *Anancus*, they range from pure browsing, as at Chilhac, to grass-dominated mixed feeding, as at Norwich Crag. Looking at the traditional microwear variables, such as the numbers of pits and scratches, the two genera display the same microwear pattern at each locality, indicating the use of similar vegetal resources. However, when looking at other microwear variables, such as the presence of large pits or puncture pits, or the scratch width, some differences between species can be detected. Our data suggest that some populations, such as *Anancus arvernensis* from Chilhac or *Mammuthus rumanus* from the Red Crag, also included large proportions of seeds, fruits, or bark in their diet. Consequently even if the broad dietary category for *Anancus* and *Mammuthus* at a given locality is the same, the microwear pattern suggests niche partitioning to avoid direct competition for food resources, as previously observed in some Miocene proboscideans (Calandra et al., 2008).

This study also confirms the importance of taking into account all microwear variables for dietary assessments because the raw numbers of pits and scratches seem to be dominated more by local environment rather than niche-partitioning.

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