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The wood of Merovingian weaponry

Willy Tegel [a, *], Bernhard Muigg [a], Ulf Büntgen [b, c, d]

[a] Institute of Forest Sciences, Chair of Forest Growth and Dendroecology, Albert-Ludwigs-University Freiburg, Germany
[b] Swiss Federal Research Institute WSL, Birmensdorf, Switzerland
[c] Oeschger Centre for Climate Change Research, Bern, Switzerland
[d] Global Change Research Centre AS CR, Brno, Czech Republic

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ABSTRACT

After metal, wood was the second most important material for weapon production in early medieval Europe. The weaponry of Merovingian warriors consisted of a double-edged long sword (*spatha*), a single-edged short sword (*seax*), a shield, a spear, an axe, as well as a bow and arrows. Belowground organic material remains have often been preserved through mineralisation processes over centuries to millennia. Although these objects are frequently found as grave goods in burials, systematic material identification is still missing. Here, we present wood anatomical features of 316 weapons from 42 cemeteries of the Merovingian Dynasty in northeastern France. The most commonly used wood for weapons was ash (*Fraxinus excelsior*), followed by alder (*Alnus* sp.) and hazel (*Corylus avellana*). While guaranteeing optimum quality and utility, these taxa were mostly considered for spears, arrows, *spatha* scabbards and shields. Density and mechanical properties further influenced wood selection. An attractive appearance of representative weaponry also affected species preference. At the same time, wood choice rooted in tradition, as knowledge transfer persisted over many centuries and cultures.

1. Introduction

The early medieval society of Europe (c. 500–1000 C.E.) was dominated by rural structures and a domestic indigenous production. The development of specialised, commercial crafts was still in its early stages. The creation of occupations such as miller, potter and blacksmith, who required extensive equipment and expert knowledge, rapidly led to the first workshops. Armourers seemed to enjoy a special standing, as indicated by various sources from the 7th and 8th century, e.g. sagas and legends such as the Völundarkviða (Elder Edda), Beowulf or Wayland the Smith, and illustrated, for example on the Franks Casket (Henning, 1991). Aside from practical use in combat, weapons had important symbolic value as an emblem of an independent warrior and the social rank of the bearer.

Burials are the most prevalent archaeological source for the Early Middle Ages, often loaded with grave goods, including weaponry. These material remains are of particular importance for historical research, as documentary evidence is generally absent for this period.

During the transition from the Late Antiquity to the Early Middle Ages in the mid-5th century, burial customs suddenly changed. Individual burials and grave groups, often in form of cremation burials disappeared (Périn and Kazanski, 2011). Subsequently during the Merovingian Dynasty between the 5th and 8th centuries, linear cemeteries with numerous inhumation burials arranged in parallel rows were located in proximity to settlements (Périn, 2006). This funeral tradition was often associated with rich grave goods. It ended in the first decades of the 8th century with the dissolution of social structures and the emergence of a feudal system with nobility by birth (Steuer, 2004). Furthermore, the increasing significance of Christianity in society was another reason to end the custom of furnishing the dead with material goods. Rich medieval archaeological finds from graves are therefore primarily limited to the Merovingian period.

Thousands of Merovingian grave goods have been excavated, studied and archived in museums and depots. Many of such objects consist of metal, ranging from coffin nails to parts of horse harnesses, vessels, jewellery and weaponry. The assemblage of weaponry covers almost the complete contemporary armament (Périn, 2006; Steuer, 1979), including *spatha* (double-edged long

* Corresponding author. Institute of Forest Sciences, Chair of Forest Growth, Albert-Ludwigs-University Freiburg, Tennenbacher Strasse 4, D-79106 Freiburg, Germany.
E-mail address: tegel@dendro.de (W. Tegel).

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sword), seax (single-edged short sword), spear, shield, axe, knife, and arrow (Fig. 1B and D).

Organic materials are rapidly degraded by belowground microorganisms. Under certain conditions, however, organic tissue in contact with metal of weapons, can be preserved for centuries. Chemical processes, comparable to fossilisation, are responsible for this preservation. Organic acids dissolve metal salts, which may act as biocides, and thus prevent the degradation of organic substances by fungi and bacteria. Wooden remains are denoted as mineralised wood (Fischer, 1994). Mineralisation of organic matter in a burial environment depends on several factors, such as metal ion concentration, soil type, temperature, pH level, and soil moisture availability (Chen et al., 1998). The quality of wood remains can differ considerably with wooden structures being either completely, or only partially steeped in metal compounds.

So far, explicit material analyses of grave goods have mainly focused on metal, textile and leather (e.g. Koch, 1990). In many cases, wooden remains were destroyed due to improper restoration. Only recently has this material attracted more scientific attention, which has forced the development of new methods for the analysis and preservation (Fischer, 2012; Haneca et al., 2012). Although numerous weapons include large fractions of well preserved wooden remains (Willerding, 1982; Feindt and Fischer, 1994), systematic wood anatomical assessments are still missing.

Here, we aim at providing the first supra-regional study of wood utilisation in weaponry across the heartland of the Merovingian Dynasty. A sufficient replication of wood samples from northeastern France was therefore analysed to provide new insight into work-piece quality and craftsmanship, as well as the motivation behind specific wood selection. The newly obtained evidence is expected to help answering further questions associated with the historical utilisation of wood.

2. Material and methods

The rapid increase of preventive archaeology in northeastern France over the past decades has permitted the systematic wood anatomical analysis of 316 weapons from 42 Merovingian cemeteries (Fig. 1A). All wood samples were examined directly after excavation and are now, for the first time, synthesised in this article.

Concerning preservation status, two situations are distinguishable. Firstly, if the wooden object is in contact with a corroding metal, a corrosion layer forms around the wood or the corrosion products permeate the wooden structure directly. In such cases only a negative imprint of the cellular structure is obtained or the wood is transformed entirely into a metal-like substance, which is interspersed with corrosion products (Fig. 1C). Hence such mineralised woods are relatively difficult to determine. The second possibility is much more conducive to wood analysis. In this case, the

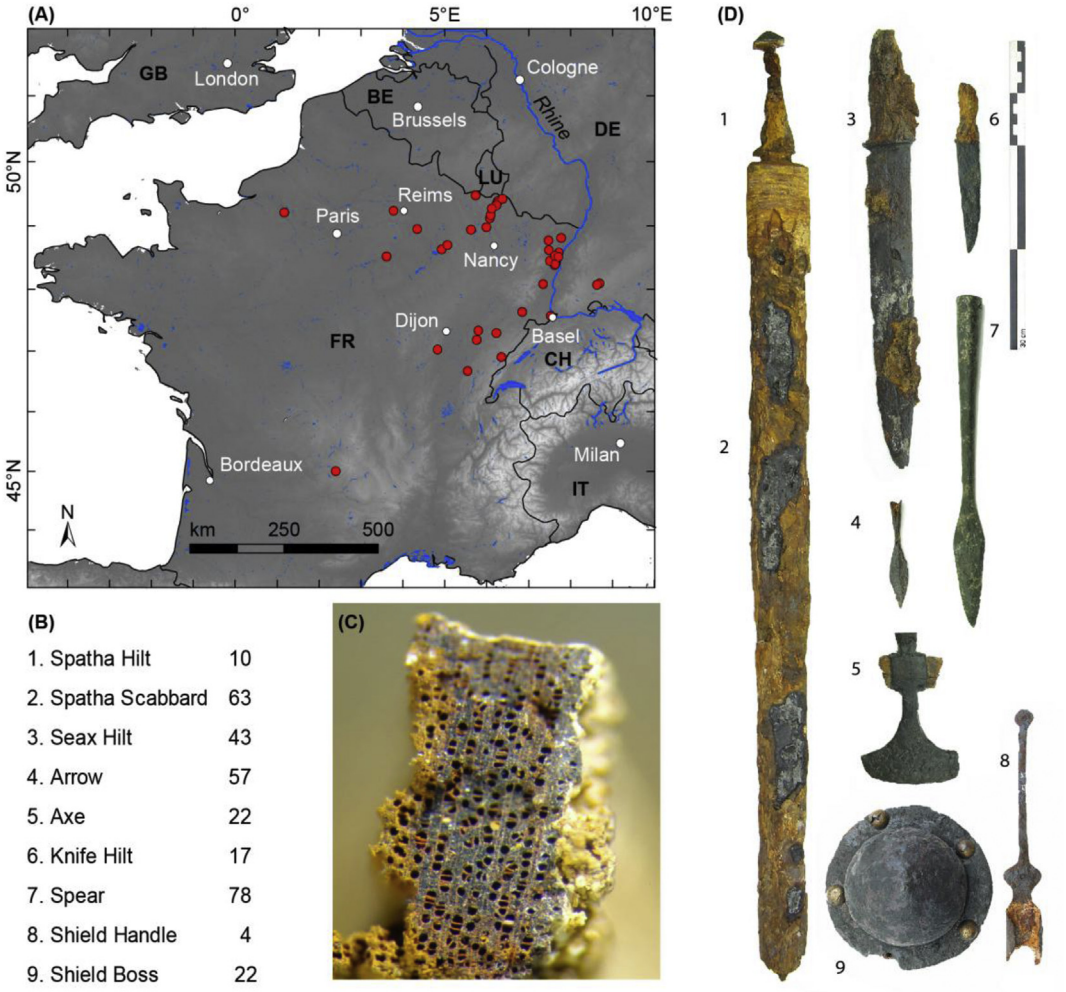

Fig. 1. (A) 42 study sites with preserved wooden weapon parts. (B) Weapon types and total number of objects examined. (C) Cross-sectional area of mineralised alder (*Alnus sp.*), fragment of a *spatha* scabbard. (D) Merovingian weaponry with partially preserved wood.