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Traces of a possible Celtic brewery in Eberdingen-Hochdorf, Kreis Ludwigsburg, southwest Germany

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Abstract. A large number of weakly germinated hulled barley grains was found during archaeobotanical analyses from the early Celtic settlement excavations at Eberdingen-Hochdorf in southwest Germany (ca. 600 - 400 BC). These grains seem to represent deliberate germination, due to the purity of the find and its unusual archaeological context. The possibility of deliberate malting which could be connected with beer brewing is discussed. Recent germination and charring experiments show that the consistently weak traces of germination on the charred subfossil grains from Hochdorf are enough to indicate malted grains. A comparison of the archaeobotanical remains with the written and archaeological sources shows that evidence of beer brewing from excavations is very scarce. There is practically no clear proof of brewing, while written sources and indirect suggestions are abundant. Neither archaeological finds nor either written or iconographic sources give exact details about the prehistoric brewing technology of the early Celts. The archaeological finds from Hochdorf seem to be the result of deliberate malting of hulled barley for the purpose of Celtic beer brewing.

Key words: Sprouted barley – Brewery – Late Hallstatt/ Early La Tène – Germination experiments – South-west Germany

Introduction

Beer has been and remains a widely distributed and important food source. The first solid evidence of beer brewing is in written form from Mesopotamia and Egypt (Hopf 1976). Beer was used for many purposes, including use as the "daily bread", an intoxicant, an offering, as grave goods, and as medicine. The first archaeological and archaeochemical evidence for beer was found at the Upper Egyptian Hierakonpolis site dating to 3500-3400 cal BC (Maksoud et al. 1994). In written sources from the ancient Greeks and Romans, beer is mentioned as an intoxicating drink used by several tribes, including the Celts (i.e. Gauls) (various authors cited in Lenz 1859). The beer (*cervisia, caelia*) of the Iberian Celts was known for its good taste and keeping properties. Written and iconographic sources as well as graphic depictions of beer brewing are common from prehistoric and early historic times while purely archaeobotanical indications of beer production are very rare. One possible archaeo-botanical indicator of beer brewing is the presence of germinated cereal grains, and recently Piening (1988) and van Zeist (1991) have collected references of such finds and discussed the possibility of intentional malting. However, only in a few of these cases do the archaeological finds allow interpretation of the malted grain finds as being used for beer production. Sprouted cereal grains can result from other processes, such as damp storage, wetting while still in the field, and deliberate manipulation for ritual means.

A relatively large amount of sprouted grain was found in the settlement excavations in Eberdingen-Hochdorf, near Stuttgart, from the late Hallstatt/early La Tène period of the Iron Age. It was therefore of great interest to deduce whether these grains were deliberately malted for beer production.

The site

The early Celtic site of Hochdorf, Gewann Reps, lies on a slope which falls slightly to the south above the present-day village of Eberdingen-Hochdorf, located approximately 15 km northwest of Stuttgart (Fig. 1). The flat rolling hills of the Strohgäu region have good climatic and edaphic conditions and are known as the bread basket of Württemberg.

The late Hallstatt/early La Tène settlement from 600 - 400 BC and of 2.65 ha was completely excavated and systematically investigated from 1989 to 1993 (Biel 1992). The Hochdorf settlement shows several anomalies when compared with other early Celtic settlements in the area. The well designed structures as well as the special finds of red fired Attic potsherds, a small bronze scale,

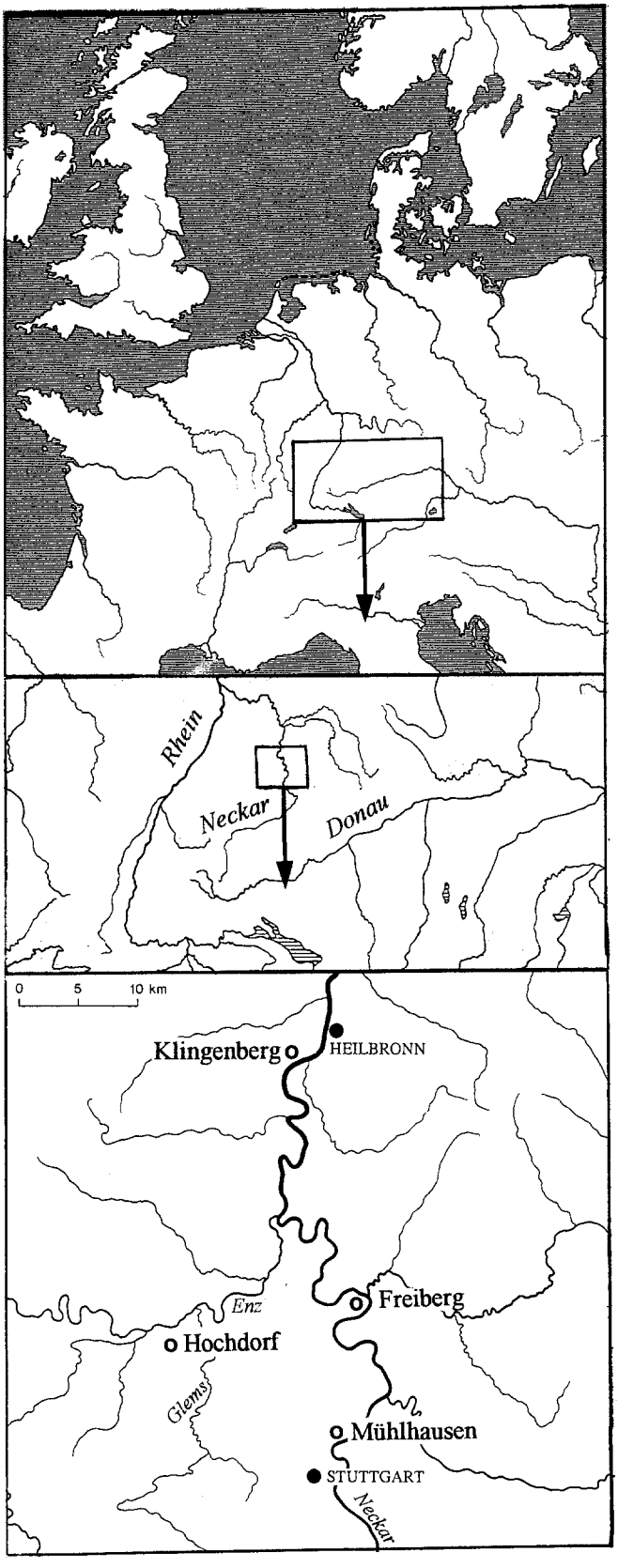

Fig. 1. Map showing the location of the archaeological site of Hochdorf, southwest Germany, and other Celtic sites mentioned in the text

and a high percentage of fine wheel-turned ceramics indicate a settlement with special status. The settlement has been interpreted as the rural residence of a prince, and is directly related to the rich Late Hallstatt grave mound of Hochdorf which lies 0.5 km to the east.

Six long ditches were excavated in addition to other structures, for example, bow-sided houses, pit-houses (*Grubenhäuser*), earthen cellars, grain storage pits, a fence system and the post-holes from storage structures. These ditches were very carefully constructed; they were long and straight, and had a U-shaped profile with straight bottoms and walls, measuring approximately 5-6 m long, 0.6 m wide and up to 1.1 m deep. It appears that wooden boards were used to support the walls, as no traces of erosion were observed on the sides.

Archaeobotanical remains and methodology

The subfossil plant remains from the Hochdorf settlement were preserved by charring and mineralisation, as the soil on the site is dry. 174 soil samples from the site, with a total volume of 1216 litres, were processed by flotation and sieving through a series of sieves, with the smallest mesh size being 0.5 mm.

Eight samples with a total volume of 82 litres were taken from three ditches with a U-shaped profile. The other samples came from 108 cellar pits and from six pit-houses. The charred and a few mineralized plant remains were analyzed in the Stuttgart-Hohenheim laboratory (following Körber-Grohne 1991).

Results: Archaeobotanical remains

The find assemblages of charred plant remains from the three U-shaped trenches are all different. Only a few plant remains were recovered from sample 1900/1. Ditches 1600/4 and 2202/3 were much richer. Ditch 2202/3 contained a 0.1 m thick layer of charred grains, which was found lying directly on the underlying loess (Fig. 2). A high percentage of wood charcoal was observed in the upper part of this basal layer, which was covered by large pieces of wood charcoal and pieces of fired clay, and in turn by clay sediment. The cereal layer contained only a small amount of chaff, primarily from spelt. Few wild plants were recovered, and they were mostly taxa that today grow in grasslands. Only a few seeds of arable field weeds were included amongst the finds (Table 1). The cereal remains were primarily hulled barley, making up 98.4% of the total grains. The small amount of wheats identified consisted mainly of spelt. Only a few finds of other useful plants, mostly cultivated, were recovered besides the cereal grains. The following species, listed in descending order of importance based on raw counts, were found: *Pisum sativum* L., *Daucus carota* L., *Lens culinaris* Med., *Linum usitatissimum* L., *Fragaria vesca* L., *Vicia ervilia* (L.) Willd., *Apium graveolens* L., *Camelina sativa* (L.) Crantz, cf. *Petroselinum crispum* A.W. Hill and *Corylus avellana* L.