Food production and food procurement in the Bronze Age and Early Iron Age (2000-500 BC)

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11 The collection of wild plants: risk reduction?

11.1 Introduction

Why do people gather wild fruits? Is it to feed their animals, like acorns for their pigs, or for their own consumption, as a snack or as a staple food or as substitute or reserve for bad times, by the designation of these species as "emergency" foods? In general, the gathering of wild fruits can be seen as a selective use and appropriation of the landscape by people living in it. In this chapter, I will present the fruits and nuts recorded in our seed assemblages collected by the inhabitants of our study region. The motives for gathering by Bronze Age and (Early) Iron Age farmers will be discussed. The agrarian subsistence system in Bronze Age and Early Iron Age is described as a mixed farming system (see chapter 2). Bronze Age and Iron Age communities were practising mixed farming, i.e. crop cultivation and animal husbandry, probably with the emphasis on cattle keeping. Indications of the collection of wild plant species are considerably less prominent than for the preceding periods, but they do exist! However, the attention paid to these aspects of later prehistoric food regimes by (environmental) archaeologists has been relatively low and farming as an "innovative" activity has naturally been emphasised often. This is unfortunate because the role of gathering in particular in the food procurement regime is underexposed and underrated this way. The role of the addition of collected food species to the diet, or the existence of the possibility to do so (e.g. whenever harvests had failed) is an important aspect of agricultural regimes of prehistoric farmers. It implied a differentiation of activities and division of the work, i.e. specialisation, and finally also a variation of the prehistoric dietary regime.

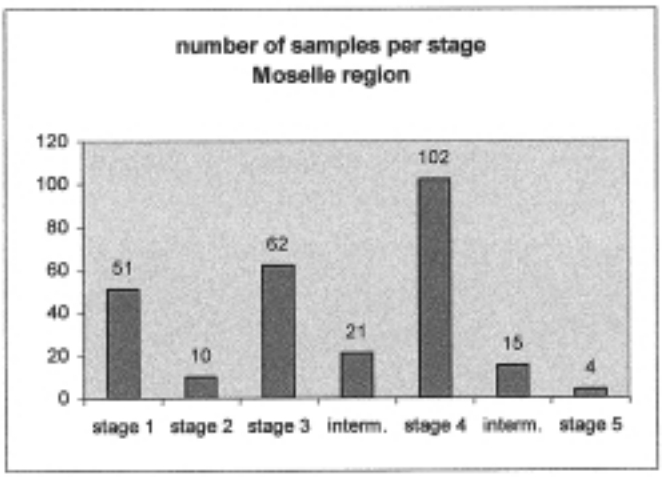
11.2 The evidence on gathering in this study

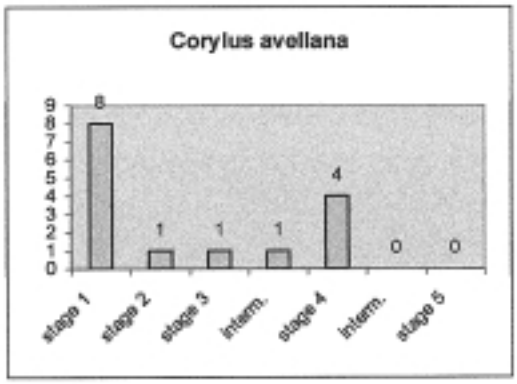
Some methodological comments should be made about the presence of collected species in our species lists. In archaeobotany, there is some discussion about which plants may have been collected for consumption in prehistory, and which have not. Some authors choose to refer to a wide range of species which could have been consumed in the past as they are fit for human consumption. Körber-Grohne, for example, listed the nutritive value and use of plant species like *Brassica* spp., *Beta vulgaris*, *Atriplex hortensis*, *Chenopodium* spp., *Rumex acetosa* and many more in her publication on *Nutzplanzen in Deutschland* (1987). Sherratt refers to the culinary use of various species which are to be found frequently in the botanical record. He mentions, for example, the use of *Filipendula ulmaria* as flavouring agent for prehistoric brews (1991). Ethnobotanical studies, historical sources and contemporary practices all regularly demonstrate that a large number of wild species are indeed suitable for use, be it for their nutritive value, or other properties.

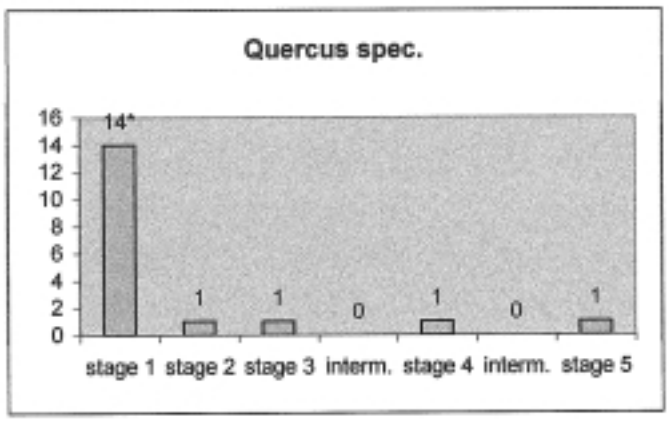
It is, however, quite difficult to make a conclusion about deliberate gathering of the wild species which occur in our record. Consumption of plants or seeds of *Atriplex* spp., *Persicaria* spp., *Rumex* spp. and *Chenopodium* spp. is possible but difficult to prove. As was shown in chapter 9, these species were found in charred crop asemblages and were (therefore) all interpreted as arable weeds. In this study, I prefer the minimal approach of listing only those species of wild plants not associated to arable fields such as acorns, hazelnut, various species of *Prunus*, wild apple etc. (see chapter 8). They are species of hedges and woodland fringes or forest, and produce edible fruits and nuts which may have been collected.

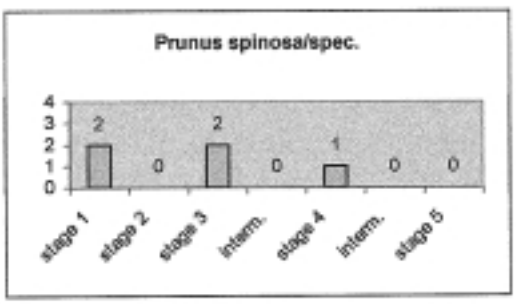
We should note that the processing of the majority of the wild species found in the assemblages does not include roasting or heating, with some exceptions (see below). Acorns, apples and possibly hazelnut can be stored as staple food. The other collected species are eaten immediately after collection and can be interpreted as "snacks". Therefore, the chance of these species ending up carbonized in the botanical assemblages, is restricted (see also chapter 8).

The chronological distribution of the frequency of fruits and nuts is shown in figure 11.1. In general, we may assume that the collection of wild fruits played an especially important role in the subsistence economy of the earliest periods. In the Chalcolithic and Bronze Ancien of the Moselle region, their frequency is considerably high. But their role in food economy remained relatively important in later periods as well, though less predominantly. For the Moselle region, evidence for the earliest period is lacking. The following chronological stages all produce evidence for the collection of fruits and nuts from the wild.



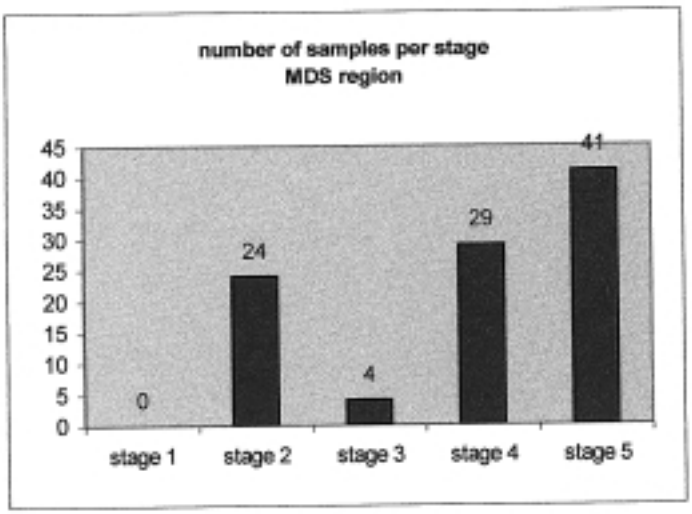


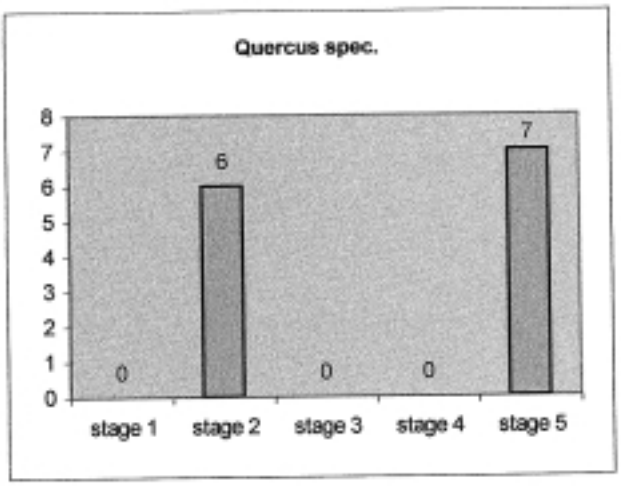


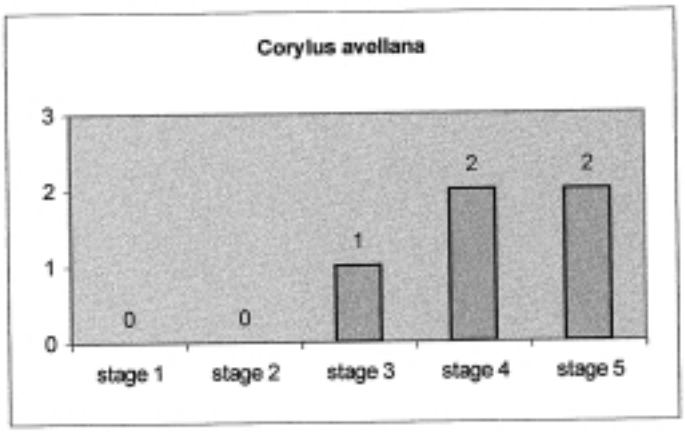


* = Bronze Ancien house Frouard Z.A.C. du Seule Gaillard

Fig. 11.1 Moselle region and MDS region - distribution of frequency of collected species in five chronological stages







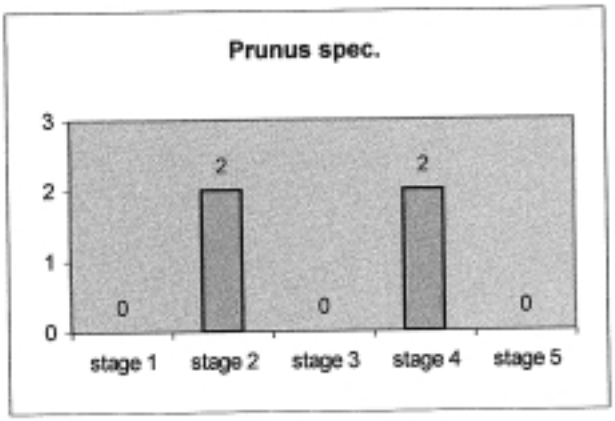


Fig. 11.1 continued

Hazelnut and acorn especially, are the predominating gathered species from our botanical records. They must have been collected during all chronological stages.
Hazelnut is attested in Moselle contexts dating from the Chalcolithic onwards (2400 BC) and during all following chronological stages until the La Tène period. In the MDS region, it is present in all chronological periods, from the Late Bronze Age onwards. The shrub can be 3 to 5 metres in height. Its nuts are ripe and ready for collection in September. The fruits may be eaten or used for their oil.
Sloe is present in the Moselle region from the Campaniforme finale through the Bronze Final and Hallstatt period in very small quantities and frequencies. In the MDS region, we encountered sloe in the Middle Bronze Age and the Early Iron Age. *Prunus insititia* (bullace) was attested in this region in the Middle Bronze Age. The fruits of sloe and bullace grow on shrubs and must have been collected from the hedges or forests surrounding the settlements or arable fields. *Crataegus laevigata* (hawthorn) was attested only once in the Moselle region, in a Bronze final IIIb-Hallstatt C context (900-600 BC). The evidence on the presence of *Malus* spec. (wild apple) in the Moselle region is based on personal comments of the archaeologists. Apples may have been stored as a "reserve", just like hazelnut and acorns. Therefore, they needed to be dried, e.g. in ovens, a practice already known from the Early Neolithic period (Bakels pers comm). The charred remains of the fruits of apple are very fragile, rapidly pulverized and unlikely to remain well preserved in archaeological contexts.
The record on collected species from the MDS region is somewhat extended by the finds of waterlogged material from Iron Age wells. These additional species are *Rubus idaeus, Rubus fruticosus* and *Sambucus nigra*, in fact, common wild species from prehistoric contexts.
Acorns form an exception to the relative scarcity of collected species in our seed assemblages. The charred remains of this fruit were found very regularly during all chronological stages. We might assume that acorns have played a special role in the food regime, as a staple food. In the next section, the role of acorns in the food regimes of Bronze Age and Iron Age farmers will be elaborated upon.

11.3 The role of acorns: balanophagy

Finds of concentrations of charred acorns are not at all exceptional and occur from the Mesolithic through to historic times throughout Europe. In Northern France, acorns are found from the Mesolithic up until the Middle Ages (Marinval/Ruas 1991, 420). Several authors have listed (pre-)historic finds of acorns in Europe (see e.g. Knörzer 1972; Karg/Haas 1996). Those data, combined with the finds in the material analysed here and other unpublished data, are listed in table 11.1.

Acorns have always been an attractive food source because of their abundant presence in autumn and their excellent storability properties. In accordance with our 21st century standards, acorns could seem rather unattractive as a food source. The presence of tannin in the fruits gives them a bitter, astringent taste. On the other hand, their nutritive value is considerable and comparable to that of cereals (Jørgensen 1977, 236) It should be taken into account that acorns are suitable as animal fodder (esp. for pigs). From the following description of acorn processing, it will become clear that our acorn assemblages all point to stocks for human consumption.
Elaborate descriptions on the process of collecting acorns are available from the ethnographic literature. Jackson (1991) observed especially the labour-intensive processing of acorns with the Western Mono Indians in Northern America. She described how collecting acorns was generally practised by the women of the local community, supported by the men. In the autumn season when the acorns were ready for collection, a maximum labour effort was required. For, when the fruits were ripe, they were likely to be eaten first by birds and insects and later, having fallen on the ground, by all kinds of animals. The acorns were collected in burden baskets. In particular, the further processing activities of the collected acorns were a specialized activity and were performed by the women of the group. The processing sequence includes drying, peeling, removing the skin, pounding, leaching and preparing. For pounding, use was made of mortar and pestle. Pounding 2,7 kilograms of acorns takes one whole day, or in other words, a single day of grinding or pounding produces an amount of acorn flour to feed an average family for two to three days.
Acorns contain tannin which gives them a bitter taste and which is poisonous to humans (Bauer/Karg/Steinhauser 1995). The tannin substances can be removed by various processes. The Mono Indians did this after shelling and pounding by rinsing the acorn flour for several hours with cold or warm water. Another method, attested by archaeological experiments, is to shell the acorns, leaving them to soak in water afterwards and then roasting them (Buurman 1990, Jørgensen 1977).
Archaeological evidence for the roasting of acorns is known from the German Rhineland. A pit dating from the Late Bronze Age and doubtlessly intended for roasting activities is known from Moers-Hülsdonk in the German Rhineland (Knörzer 1972). The large pit (4 metres wide and 2,4 metres deep) produced burnt loam and other traces of fire in the filling as well as a red-burnt floor surface. Charred remains of apple, hazelnut and large quantities of acorns were found inside the pit. All evidence points towards the interpretation of a roasting or drying pit for the roasting of acorns and other fruits.

location	date	number of acorns	author
Hazendonk 40	Neolithic	fragments	not published
Denekamp	Neolithic	+	not published
Eeserveld	Neolithic	+	van Zeist 1968/1970
Wijchen-Berendonk	Neolithic	+	not published
Schipborg	Early Bronze Age	+	van Zeist 1968/1970
Frouard "Z.A.C. du Saule Gaillard"	Early Bronze Age	+++	de Hingh this study
Huidbergsveld	Middle Bronze Age	+	van Zeist 1994
Kesseleijk-Kemperheide	Middle Bronze Age	fragments	not published
Geldrop	Middle Bronze Age	+++	de Hingh this study
Son en Breugel	Middle Bronze Age	+	Bakels/van der Ham 1980
Peppingen-Keitzenberg	Bronze final IIb	+	de Hingh this study
Moers-Hulsdonk	Late Bronze Age	+++	Knorzer 1972
Cuijk-Padbroek II	Bronze Age	++	not published
Yutz Contournement 1995	Hallstatt?	+++	de Hingh this study
Ommen	Early Iron Age	++	van Zeist 1968/1970
Colmschate	Early Iron Age	+	Buurman 1986
Huidbergsveld	Early Iron Age	++++	van Zeist 1994
Amersfoort	Iron Age	++++	Buurman 1990
Son en Breugel	Iron Age	+	Bakels/van der Ham 1980
Vlaardingen-Broekpolder	Iron Age	fragments	van Zeist 1974
Woippy-Hergott	La Tène	+	de Hingh this study
Evergem	La Tène A	+	De Ceunynck et al. 1984

+ = 1-10 specimens
++ = 10-100 specimens
+++ = 100-1000 specimens
++++ = more than thousand specimens

Table 11.1 Charred acorns finds

Acorns may be eaten as boiled fruits (soups), porridge, pulp or used as flour for bread, as a substitute for cereals (Jacquat 1988, 84; Marinval 1988, 45).
The finds of carbonised acorns from our samples consist solely of kernels, often split into halves. A short exposition of the botanical composition of this fruit is in place here: kernels of acorn consist of two seed halves hulled by a very thin skin. This whole is enclosed by a thin shell of 0.2 - 0.3 mm thick. The kernel is partially placed in a cup that loosens when the fruit is ripe. In the spot where the shell is fused to the cup, it thickens to a corky slice of c. 5 mm diametre and 1 mm thickness (Buurman 1990, 3).
Neither shells or cups of the nuts were found in our botanical record. This suggests that the shells, which are indeed inedible for humans, were removed prior to carbonisation (Karg/Haas 1996, 430). The splitting of the kernels possibly occurred during carbonisation (although it is also possible that it happened during the archaeological excavation or during transport). This proves that in Northwest European prehistory, acorns were roasted before consumption, which contrasts with North American traditional communities for example, where they were cooked or rinsed (see above). It also implies that the acorn assemblages retrieved from our study material do not consist of natural concentrations of acorns, nor stocks of animal fodder.
The addition of acorn to the daily meal could point to a diversity of the range of foods available for consumption, but diversification of the subsistence base is not the principal contribution of acorns, in my opinion. The principal role of *Quercus* in the agricultural regimes of prehistoric communities should be found in its properties as "reserved food", which can be eaten in cases of an emergency, like major harvest failures. They have a so-called shelf life, which means that they can be stored for a certain time. According to some, this shelf life is limited to six months just long enough to cover the period from harvest through to winter's end (Zvelebil 1994; Halstead 1990, 155). In North-America, acorns are stored in special granaries and can last for two

years (Jackson 1991). Ethnographically, we know that fruits, nuts and grains were indeed parched, dried and ground into flour to prolong their storage life. To summarize, we might view *Quercus* as a principal element of risk buffering mechanisms in farming communities (Halstead/O'Shea 1989).

11.4 Conclusion

Gathering of acorns, hazelnut and perhaps other fruits to a limited extent, must have been an essential element of subsistence economy in the Bronze Age and Iron Age. The peak of this practice occurred in the early periods where the frequence of these species, especially in the Moselle region, is relatively high. In my opinion, collection of wild plants may be regarded as part of an intensified subsistence system. It points to diversification of agricultural and food procuring activities as well as to variation in food stuffs.

In particular, the role of acorn must have been of considerable importance as an element of risk buffering strategies, thanks to its excellent storability. Interestingly, the occurrence of acorn stocks are a common phenomenon throughout all periods. The storage of these fruits appears to be deemed necessary in the fully developed agrarian societies from the Neolithic until far into the Iron Age. The collection and consumption of acorns by people who live in what are predominantly farming communities reveals a great deal about the perception of these communities towards food and food procurement. As mentioned earlier in the text, farming communities had only limited goals: to feed the family and to minimize risk. Apparently, the building up of acorn stocks, although not the most attractive food resource, must have been one of the instruments to reach those goals.

In chapter 3, the research model of agricultural intensification was described. It was suggested there that one aspect of an intensified agrarian production system is the increase of the components of which the system is built up, i.e. diversity. One aspect of this diversity is the essential supplement on crop cultivation formed by the collected species. Another aspect of diversity is the aim towards risk-reduction. We should also consider the extensive labour investments that are associated with these activities: the gathering, leaching and/or roasting procedures used to render the bitter acorns into edible food stuffs are relatively labour intensive.

The presence of acorns in later prehistoric seed assemblages has led some archaeobotanists to consider the possibility of the appropriation of oak trees by local groups. A single oak annually produces an average of 700-1000 litres of acorns (see also ten Cate 1972). This amount would be sufficient to feed an (extended) family during one winter season (see above). It could be suggested that the appropriation of single oak trees inclusive of the right to the collection of acorns from particular trees could well have been reserved to single individuals, single families, or single local groups (Kroll pers comm; Schama pers comm).[19] There are a number of references to historical association of woodland and tree planting with property ownership and with the legitimisation of access to land (see for references Butler 1995, 18). Furthermore, Karg and Haas suggested the possibility of tree management of oaks in prehistory. In general, Middle European oaks (*Q. robur* and *Q. petraea*) go through a 2 to 6 years cycle with regard to their fruits. In order to enlarge the yields it would be sufficient to open up the stand place of the trees, to increase the light and the availability of nutrient resources. In this way, a double harvest of acorns could be guaranteed (Karg/Haas 1996, 430).