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Observation of "Traditional" Agriculture in Kastamonu, Turkey in Relation to the Evidence of Crop Husbandry at Neolithic Çatalhöyük, Central Anatolia

Abstract: In order to better understand how plants were procured and consumed at Neolithic Çatalhöyük, the site's archaeobotany team examined some of the existing ethnographic examples of "traditional" (non-mechanised) farming in Turkey. The Kastamonu region of the north Turkey is an area where some 'ancient' wheats (einkorn and emmer) are cultivated in a more or less traditional way and on a small-scale. Fieldwork in this part of Turkey provided first-hand knowledge of some off- and on-site agricultural activities which could have been part of prehistoric village life, but also of ways in which modern technologies challenge non-mechanised farming[*]. Of particular interest were a) information gathered from field-owners on traditional techniques used to grow crops, b) observation of storage facilities and other ways of storing food in einkorn/emmer-growing villages, and c) observations of mills and other buildings/constructions/items relating to crop processing and food preparation (e.g. oil production); the paper presents obtained information relevant to these three key objectives.

Key words: ethnoarchaeology, Anatolia, agriculture, plant storage, Neolithic

Introduction

Ethnography and ethnographic method have significant role(s) in a range of different human-centred disciplines (e.g. social anthropology, sociology, history, religious studies), and they have long been recognised as critical for understanding various aspects of human behaviour in the past. Ethnographic observations of living cultures are widely used in archaeology, contributing to

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the understanding of fragmentary archaeological record (e.g. Yellen 1977; Kramer (ed.) 1979, 1982; Watson 1979; Hodder 1982; David and Kramer 2001).

In terms of farming practice, observations and recording of crop types, techniques, tools, structures, processes etc used in, or related to non-industrial agriculture practiced today or in the recent past, have proved extremely useful in reconstructions of ancient agricultural systems and interpretation of archaeological evidence of farming (e.g. Hillman 1981, 1984, 1985; Jones 1984, 1987; Peña-Chocarro 1999; Ertuğ-Yaraş 1997; Ertuğ 2000a, 2000b, 2004; D'Andrea and Mitiku 2002; Hajnalová and Dreslerová 2010). Archaeobotanists in particular have had a significant interest in documenting and examining crop husbandry practices and plant-related activities in ethnographic context. Studies of traditional farming in various parts of the world have provided valuable analogies for identifying the evidence of specific harvesting and post-harvesting techniques in archaeobotanical assemblages (e.g. harvesting method and height, treatment of crops after the harvest – drying, cleaning, storing etc, preparation of plant products for consumption) (e.g. Hillman 1981, 1984, 1985; Peña-Chocarro 1999; Ibáñez Estévez *et al.* 2001; D'Andrea and Mitiku 2002). Moreover, ethnoarchaeological models of crop processing have demonstrated a great potential for determining the 'origin' of archaeobotanical material and its association to a particular stage of the crop cleaning sequence (Hillman 1981, 1984; Jones 1984, 1987).

Beyond the technological aspects of agricultural activities that might have also been part of every-day life in the past, the ethnographic record represents an invaluable source of information on a number of steps and decisions included in the food production process, such as reasons behind differences in crop choices and preferences, variations in storage of plant products and food preparation, mechanisms for ensuring sufficient yield in 'bad years'. Furthermore, it can offer insight into certain socio-cultural aspects, for example how social life is structured around daily work tasks, the vernacular knowledge and traditional skills and their passage through generations, social and age/gender-based differentiation reflected as e.g. limited access to agricultural resources or division of labour, and so on (e.g. Watson 1979; Ertuğ-Yaraş 1997; Ertuğ 2000a; D'Andrea and Mitiku 2002; Giuliani *et al*. 2009; Hajnalová and Dreslerová 2010).

There have been contrasting views as to the validity and pertinence of ethnographically-based analogical inferences (and analogy in general) in archaeology (e.g. Wylie 1985, 2002 *contra* Gould 1980) as they may involve unjustified projection of the present onto the past (Fahlander 2004), and their 'strength' may be low (i.e. they may be based on formal similarities without considering causal relations - Wylie 1985, 2002). There is though a more or less general agreement that ethnographic observations certainly have a constructive role in archaeological inquiry and, as comparative datasets, a potential to broaden interpretive hori-

zons, but that it would be wrong to accept them as a direct evidence of distant past and use them as a basis for explanations of archaeologically derived patterns (e.g. Gould 1980, 29-36; O'Connell 1995; Wylie 2002; Hopkins 2003). No attempt has been made here to assess potential analogical strength of the observations in Kastamonu in relation to the archaeological record at Çatalhöyük. Instead, an overview of the evidence of plant-use and plant-related activities is provided, and similarities and differences pointed out, with an awareness that the understanding of human behaviour and its material consequences in present-day communities can allow for some aspects of past behaviour to be described more fully and perhaps with greater accuracy (cf. Ascher 1961; Hodder 1982; Wylie 1985, 2002; O'Connell 1995; David and Kramer 2001).

The Study of Agricultural Practices in Kastamonu

It has previously been observed that, agricultural practices in some rural areas of Turkey offer valuable insight into social and technological aspects of non-industrial agriculture and plant-related activities that might have also been incorporated into, for example, Neolithic every-day life (Hillman 1981, 1984, 1985). The work of Turkish ethnobotanist Füsun Ertuğ represents a major source of information on the range of crops grown and wild plants gathered and utilised in rural (and urban) Turkey, as well as on the socio-cultural role of plants in lives of Turkish people (e.g. Ertuğ-Yaraş 1997; Ertuğ 2000a, 2004). In addition to the pioneer ethnoarchaeological study of Patty Jo Watson in Iran (Watson 1979), the ethnographic approach of Gordon Hillman and Füsun Ertuğ to the study of plants from archaeological sites 'inspired' most archaeobotanists working in Turkey (and beyond) to consult and include ethnographic observations in their interpretation of human - plant relationship in the past.

It was Hillman and Ertuğ that had noted the Kastamonu region in northern Turkey as an area where some 'ancient' wheats (einkorn and emmer) are still under cultivation and regularly consumed as bread or bulgur, a tradition that may be several millennia old (Hillman 1981; Ertuğ 2004). Einkorn (*Triticum monococcum*) and emmer (*T. dicoccum*) represent earliest cultivated plants of the Near East and they were domesticated by *c*. 9000 cal. BC, as were other Neolithic 'founder crops' (barley, pea, lentil, chickpea, bitter vetch, flax); they are commonly found in Neolithic archaeobotanical assemblages across south-west Asia and Europe (e.g. Zohary and Hopf 2000; Colledge and Connoly (eds.) 2007; Weiss and Zohary 2011). At Çatalhöyük, remains of einkorn and emmer are most frequent and abundant among crops, and are often found in storage deposits (Helbaek 1964; Fairbairn *et al*. 2005; Bogaard *et al*. in press/2012).

As part of an ongoing ethnoarchaeological project supported by the Fell Fund, University of Oxford on traditional cultivation, processing and storage

of cereals and pulses in various regions of Anatolia, in 2008 Çatalhöyük archaeobotany team members[1] took an exploratory trip to the region of Kastamonu to observe current management practices for growing of the hulled wheats, einkorn and emmer (Bogaard *et al*. 2008). Though relatively distant and geographically very different area to Konya plain where Çatalhöyük is located (see below), Kastamonu region was considered suitable for the study, given that hulled wheats were major cereal crops at the Neolithic settlement and are therefore central to interpretation of the assemblage (Fairbairn *et al*. 2005; Bogaard *et al*. in press/2012; Filipovic, unpublished data). The fieldwork was expected to provide first-hand knowledge of on- and off-site agricultural activities which must have also been part of prehistoric village life, and to note variations in farming practices, as well as to observe artefacts and structures used in plant production and consumption. Of particular interest were a) information gathered from field-owners on the traditional techniques used to grow and process crops, b) observation of storage facilities and other ways of storing food in einkorn/emmer-growing villages, and c) observations of mills and other buildings/items relating to crop processing and food preparation (e.g. flax oil production). The villages visited by the team (Table 1) belong to the administrative territory of several districts of the Kastamonu province, including the capital district (Kastamonu), and are located in central and eastern parts of the province (Fig. 1).

Neolithic Çatalhöyük

The site of Çatalhöyük consists of a pair of mounds/tells – the Neolithic East Mound and the Chalcolithic West Mound located near the modern town of Çumra in the central part of the Konya plain, on southern edge of the Central Anatolian Plateau in south-central Turkey (Mellaart 1967; Hodder (ed.) 1996). The mounds are situated on opposite sides of an old branch of the river Çarsamba Çay that runs from the Taurus Mountains in the south and flows into the Konya plain. The Konya basin lies at an elevation of *c*. 1000 m above sea level and is surrounded to the north and east by the Anatolides chain and to the south by the Taurus mountain range, with a volcanic massif (Karadağ) in the centre of the basin (de Ridder 1965, 231; Driessen and de Meester 1969, 7-8; de Meester (ed.) 1970, 20). In addition to the Çarsamba River, a number of other watercourses enter the plain from the Taurus Mountains and form a

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range of features in the landscape - alluvial fans, marshes and lakes (de Ridder 1965, 233; de Meester 1970, 22).

The Neolithic East Mound at Çatalhöyük is one of a number of large early farming settlements that developed in the 8th millennium BC in south-west Asia. It has been considered a part of the Central Anatolian Neolithic cultural complex (e.g. Gérard and Thissen (eds.) 2002; Düring 2006). The Central Anatolian Neolithic has been dated to approximately 8500-6000 cal. BC (Thissen 2002, Fig. 1), while Çatalhöyük East is dated from *c*. 7400 to 6200 cal. BC and is late in the Central Anatolian sequence, occurring at the very end of the Aceramic Neolithic and into the Ceramic Neolithic (Cessford *et al*. 2005). The site has become famous in excavations by James Mellaart in 1960s, who uncovered remains of a large, pueblo-like agglomeration of houses ("the world's first city"). In 1993 excavations were renewed with an international team of archaeologists led by Ian Hodder (Hodder (ed.) 1996; www.catalhoyuk.com). The project has included site excavation, archaeological field survey of the Konya Plain (Baird 2002, 2005) and an off -site palaeoenvironmental investigation (Konya Basin Palaeoenvironment Project - KOPAL) (Roberts *et al.* 1996, 1999; Boyer *et al.* 2006).

The site is renowned for its immense size and, among other things, its well-preserved houses with wall paintings, reliefs, animal installations and various art/symbolic object. The buildings at Çatalhöyük were closely-packed mudbrick structures of about 19 to 32m² in size, with pillars, usually of wood, to help support the walls and roof; the roofs were flat and frequently used for various activities and communication (Matthews 1998, 2005; Cutting 2005). In general, every house consisted of a large main room for every-day activities, flanked by one small side rooms, used for food storage and, partly, food preparation. Inside the main room, common features were platforms (raised areas) with human burials underneath; each house had an oven and additional hearths, ladder 'emplacement' approximately below the roof opening, storage bins/basins most often in small rooms. New houses were rebuilt on top of old ones, though sometimes the space where an old house stood was sometimes left open for some time, and was used for rubbish discard (midden) area for surrounding buildings, as penning area and/or a place for some outdoor activities. The fifteen identified superimposed building horizons/levels of occupation spanning over a thousand-years resulted in the formation of a mound/tell 15 m high and 13 ha in area (Mellart 1967; Hodder (ed.) 1996).

The site's economy was founded on a combination of agriculture and sheep/goat herding, combined with gathering of wild plants and hunting of wild animals, including cattle (*Bos primigenius*). Archaeobotanical and zooarchaeological data from the earliest levels of the settlement onwards point to the cultivation of a range of cereals and pulses, as well as herding of sheep and goat. Of crops, the most abundant are remains of cereals - wheat and barley,

and pulses - peas, lentils, bitter vetch; they were grown, processed, stored and consumed as food and/or fodder. Some wild species were also gathered for food or fodder, such as almonds, plums, pistachio, hackberries, tubers, acorns and wild mustard seeds most probably used for oil production (Fairbairn *et al.* 2002, 2005, 2007; Russell and Martin 2005; Bogaard *et al.* 2008, in press/2012; Filipovic, unpublished data).

Evidence of Plant-Use

Indirect evidence for plant production and consumption is available from artefactual data linked with certain plant-related activities; for example the ground stone assemblage consists of what are probably multi-functional tools that were involved in some stages of plant processing (milling, grinding, cracking etc) (Baysal and Wright 2005). Furthermore, wooden and ceramic vessels and baskets likely relate to plant food processing and/or storage (Fairbairn *et al*. 2005; Last 2005; Rosen 2005; Wendrich 2005), as well as built features – bins and basins (Atalay and Hastorf 2006; Fairbairn *et al*. 2005; Bogaard *et al*. 2009). Clay bins were used for storage of plant products and they are found in majority of the excavated houses, usually placed in small side-room, sometimes in a cluster and occasionally with walls preserved to a certain height. Baskets and other containers made of perishable materials were presumably also used for storage, but they often remain invisible in archaeological deposits (Fairbairn *et al*. 2005, 2007; Atalay and Hastorf 2006; Bogaard *et al.* 2009). In most cases bins are found empty of plant macro-remains; however there are quite a few excavated burned buildings with bin contents found *in situ*, and these demonstrate that bins were indeed used for storage, and for storage of plant products, both wild and cultivated (Fairbairn *et al*. 2005; Bogaard *et al*. 2008, 2009, in press/2012; Twiss *et al*. 2009). Moreover, the analysis of phytoliths from bins in unburned buildings show evidence for concentration of certain plant types which are consistent with the types represented by macro-remains in burnt buildings (Ryan in press/2012)

Direct archaeobotanical evidence at Çatalhöyük, in the form of charred macro-remains, of plant-related activities at Çatalhöyük comes from burnt deposits, and the most reliable/informative are burnt deposits from storage facilities, fire installations, and outdoor in situ burnt deposits (not related to features). These are considered 'primary contexts' with a concentration of botanical material preserved at a burning spot or adjacent to it and not disturbed by subsequent activities/mixing (cf. Miksicek 1987).

Burnt storage deposits have provided information on the range of cultivated (cereals and pulses) and collected plants (e.g. wild mustard seeds, almonds, acorns – Fairbairn *et al*. 2005, 2007; Bogaard *et al*. 2008, 2009); they

suggest that the diet was based on a range of wild and cultivated species. Based on the state of the plants preserved in the burnt stores (i.e. seeds/nuts with coverings - nutshell, cereal husks, pea pods etc), pre-storage processing activities can be inferred; for example, concentrations of fully processed free-threshing cereal grain, or a combination of hulled wheat grain and some chaff found in a preserved crop-bin contents probably reflecting storage of grain in the spikelet (e.g. Bogaard *et al*. 2008, in press/2012). The storage of grain in spikelet or pulse in pod implies necessary hand-cleaning of grain/seed for food on a daily basis or piecemeal; thus, burnt plant stores also offer information on daily food preparation habits and consumption.

Furthermore, *in situ* burnt crop remains in bins, usually accompanied by weeds, offer a basis for consideration of growing conditions in the fields. Ecological and biological characteristics of arable weeds have proved highly reliable indicators of aspects such as, for example, level of soil disturbance, and practices of irrigation, manuring, crop rotation etc (e.g. Charles *et al*. 1997; Jones *et al*. 1999; Bogaard 2004). Along with crops, weeds can shed light on methods used to carry out some the other off-site plant-related activities, for instance sowing time, harvesting techniques, crop processing (e.g. Jones 1984, 1987, 1990; Bogaard *et al*. 2005a; Bogaard 2004, 2012).

The crop/wild plant yields and the scale of storage can also be inferred from the clay bins. Their presence, size and number indicate expected production of regular quantities of plant food each year. An estimate of capacities of bins excavated by the current project revealed an average bin volume of around one cubic metre, providing ample room for nearly a ton of cereal grain or similarly concentrated plant food; this amount would be sufficient for an annual food requirement of a family of *c*. 5-7 people (Bogaard *et al*. 2009). Besides clay bins, there is also evidence of use of perishable storage containers and presence of bundles in the storage areas of houses (Rosen 2005; Atalay and Hastorf 2006; Bogaard *et al*. 2009), representing additional plant stores.

Beside concentrations of in situ burnt plant material in bins, there are other burnt deposits, such as (indoor) fire installations that can provide information on plant activities that were happening inside the houses, in small external courtyards generally used for dumping rubbish, or on rooftops. Fire installations usually contain a combination of remains of different plant material used as fuel (wood, crop processing by-products, plant material derived from animal dung used as fuel - Fairbairn *et al*. 2005; Asouti 2005; Bogaard *et al*. in press/2012); they indicate some stages of plant processing, discard of by-products and consumption of products.

Outdoor *in situ* burning events are represented as discrete lenses of charred residue, so called fire spots; they often contain distinctive combinations of crop and wild plant material, representing specific activities/events (Bogaard *et al*. 2005b, 2008). For example, a concentration of remains of pea pod, few

pea seeds and mostly weed seeds indicates hand-cleaning of peas prior to consumption; another case reflects hand-cleaning of hulled wheat grains for meal preparation, evidenced as a combination of hulled wheat chaff and weed seeds (Bogaard *et al*. 2005b). Possible residues from individual food preparation activities are also occasionally found in middens where they form distinct ash lenses within otherwise mixed 'rubbish' deposits. In one of these a concentration of nutshell (mostly almond, some terebinth) was discovered, suggesting nut-processing on a small scale, for instance shelling of several handfuls of nuts at a time (Filipovic, unpublished data).

Based on the archaeobotanical evidence, the implication is that restricted amounts of plant food were being processed at any one time on site, and that the preparation of plant foods (and plant sharing) was conducted on a small-scale and within small groups – probably families or households. Furthermore, based on the scale of storage and position of bins within houses, it appears that the stores of plant products were private, concealed in small rooms, accessible only to the residents, in contrast to installations of animal parts (presumably from feasts), which were often 'on display' in the main room (Bogaard *et al*. 2009; Twiss *et al*. 2009). Thus, despite the closely spaced buildings that probably reflect tight relations among occupants of neighbouring houses, each household at Çatalhöyük appears to have had its own domestic plant food storage, and the on-site plant-related activities such as plant food storage, food preparation and consumption were 'private' and practised within individual households.

"Traditional" Farming in Villages of Kastamonu

Most of the territory of Kastamonu province in the Black Sea region of Turkey is a harsh mountainous zone covered in forests, with most of the districts of the province situated between 600 m and 1200 m elevations (Tağı and Jirousek 2005; Giuliani *et al*. 2009). The difficult terrain made transportation and communication in the past difficult, and the severe climate, with heavy snowfall in winter, resulted in complete isolation of some high-mountain areas for part of the year (Tağı and Jirousek 2005). Arable land is limited and the production is carried out on a small-scale, seldom over the level of fulfilling the needs of individual village households (Tağı and Jirousek 2005).

Einkorn and emmer cultivation in Kastamonu is usually restricted to remote districts/villages in the mountains (pers. observation) and the two wheat types appear well suited to growing on these poor soils and in the harsh environment (Nesbitt and Samuel 1996; Giuliani *et al*. 2009). Their cultivation is practised by subsistence farmers who belong to the poorest segment of the population (Giuliani *et al*. 2009). The two wheats are locally known under diffe-

rent names in different villages (Karagöz 1996; Ertuğ 2004, Table 1; Giuliani *et al*. 2009), e.g. the term *siyez* refers to emmer (Karagöz 1996), but can also refer to einkorn in some places (Ertuğ 2004, 180). In the villages visited by the Çatalhöyük team einkorn was referred to as *siyez*, and emmer as *gernek*. Local festival that the team attended in the town of Ihsangazi celebrates einkorn known as *siyez* (*Ihsangazi Siyez Bulguru Festivali*).

Both wheats are used in human consumption (in the form of bulgur or flour) and as animal feed. They can still be acquired from farmers markets (e.g. in the city of Kastamonu – pers. observation) though much less than it was the case about 40 years ago; they have been increasingly replaced by more profitable high-yielding modern wheat varieties (Ertuğ 2004; Giuliani *et al*. 2009). However, it appears that consumers (especially from urban areas) are beginning to recognise the advantages of the ancient wheat over modern varieties in terms of the nutritional properties (e.g. high fibre, low carbohydrate content) and appealing flavour (Ünal 2009; Giuliani *et al*. 2009). The above mentioned Ihsangazi festival is an attempt by the district officials to promote and conserve ancient wheat cultivation (though, according to the farmers' views, state subventions would be much more effective in this respect).

Crop Growing and Processing

The 'archaic' (non-industrial) methods of crop cultivation and processing, recorded in parts of Anatolia, including Kastamonu, in the 1970's (Hillman 1981) have largely been replaced by agricultural machines (tractors, harvesters) generally used for field preparation and harvest; households without their own machines hire or borrow them. Agricultural tools and structures used in the past can still be seen in some villages, and in few places they are put on display and the activities demonstrated to visitors (e.g. organic farm in the village of Izbeli Çiftliği; open-air ethno-museum in Zümrüt Köyü).

Since field maintenance is mostly mechanised, information about size of fields and their distance from owners' homes, as well as crop yields were not of particular relevance to the present ethnoarchaeological study, which was aimed at obtaining information comparable to those available for the Neolithic Çatalhöyük. For example, the distance of crop fields from the settlement could potentially imply the level of intensity of crop cultivation (e.g. Jones *et al*. 1999). Intensity of cultivation refers to the level of labour input per unit area of land. Intensive cultivation systems are characterised by high levels of invested labour per unit area aimed at increasing the productivity of arable land. Extensive cultivation strategy is characterised by low levels of labour input and hence lower yields per unit area compared to intensive systems, but larger net areas of cultivation potentially resulting in larger absolute yields (Halstead

1987; Jones et al. 1999; Bogaard 2004, 2005). In the context of mechanised farming, information provided by Giuliani *et al.* (2009, 223 and Table 2) on field size and yields for emmer-growing households in the provinces of Kastamonu and Sinop may be useful.

Most of the farmers in Kastamonu use chemical fertilisers and/or herbicides to improve crop growth; however, though restricted, there are still some farmers employing 'traditional' husbandry methods (e.g. manuring) to grow cereals and pulses without the use of chemicals (e.g. 'organic farm' at the village of Izbeli Çiftliği).

It has further been observed that einkorn and emmer are grown in separate fields and are processed, stored and used separately, which is highly relevant for taphonomical considerations of archaeobotanical remains of einkorn and emmer at Çatalhöyük (and elsewhere). Namely, these are hulled wheat types, and their grain is tightly enclosed in glumes; through initial processing (threshing), the ears are broken into spikelets, which further require dehusking prior to consumption (unlike free-threshing wheat, where threshing releases 'free' grain). Due to their identical cleaning requirements, in the archaeobotanical analysis of crop processing einkorn and emmer are usually considered together, and they are sometimes grown together (e.g. Jones and Halstead 1995). Crop processing involves a series of steps by which the harvested crop is processed into grain and other products such a straw and chaff. Processing of hulled wheats places a great labour demand and this seems to be one of the reasons for a decline in cultivation of the traditional wheats in some areas of Kastamonu (Ertuğ 2004; Giuliani *et al*. 2009), though in the villages visited within this study, threshing machines are frequently used for the basic cleaning of crops, and electric mills for grinding grain into bulgur (coarsely ground/cracked wheat grain) or flour. As noted, 'traditional' crop processing (cf. Hillman 1981, 1984) is not practised anymore but the interviewed farmers do remember the 'old' way of cleaning of crops, e.g. threshing using threshing sledge or trampling by an animal (cattle, horse).

The separate cultivation and post-harvest treatment of einkorn and emmer is a result of the differences in their use. Einkorn in primarily used as food, while emmer is often intended as fodder for dairy cows, though preference for one or the other wheat for human consumption varies from village to village in Kastamonu province (Ertuğ 2004). Einkorn (and emmer) is threshed, dried and stored as spikelets, which are then dehusked and ground in mills, then fine-sieved/winnowed to remove chaff; the flour is used to make different kinds of bread. For bulgur preparation, the spikelets are parboiled, dried and taken to a mill to be cracked, and then sieved and/or winnowed to remove the husk. Processed crops are stored (as spikelets, bulgur, or flour) for subsequent consumption, while part of the yield is kept in the spikelet for seed corn (thus, sowing of spikelets rather than clean grain is practiced).

Structures Related to Crop Processing

As noted above, dehusking and grinding of einkorn and emmer are carried out in mills. Large modern mills or those that use electricity to power old millstone machinery in Kastamonu do not in general process hulled wheats because of the time- and energy-consuming procedure (Giuliani *et al*. 2009). Also, it appears that stone mills using water and wind energy guarantee a higher-quality (i.e. better-tasting) product compared to modern mills (Giuliani *et al*. 2009). However, the number of existing traditional mills (*bulgurhane* - Ertuğ-Yaraş 1997) is low and few of them are functional. One of the still-working water mills was observed in Ihsangazi, and the process of milling wheat for bulgur production was demonstrated by the miller (Fig. 2). The wheat (einkorn) was sampled before and after the processing (so as to compare the composition to the archaeobotanical samples); the milling set-up and processing-related items (e.g. grinding stones, wooden pail for measuring the amount of wheat processed), as well as the time required to process a batch of wheat were documented.

The team had a rare opportunity to observe a flax (linseed) oil mill (*bezirhane* - Ertuğ-Yaraş 1997) in the village of Korupınar; the mill is not in use anymore, but is still functional - as demonstrated by the village people (Fig. 3). The construction of the mill follows the principle similar to oil-mills recorded in other parts of Turkey (Ertuğ 2000b) and combines human and animal power in the multi-stage oil production procedure (for details of the process see Ertuğ 2000b, 181-182). Samples of ground flax seed were collected from the milling area for the archaebotanical reference collection (though flax seeds at Çatalhöyük are rarely found and they probably derive from a wild taxon – Fairbairn *et al*. 2005; Bogaard *et al*. in press/2012; Filipovic, unpublished data).

Flax production was common in Turkey and flax seed and oil were until recently widely used for cooking, while oil was also used for lamps and in animal husbandry (Ertuğ 2000b). Nowadays local flax production has largely disappeared, though occasional flax field and small-scale production can be encountered (for example, a flax field in the village of Çatalyazı where the flax-growing family uses roasted flax seeds and flax oil in making pies and pasties).

Plant Storage

The final goal of the Kastamonu study was the observation of storage facilities for keeping crops and other major plants or plant products, the average quantities of stored products and the time period over which they were stored and used (e.g. annual supply).

A range of ‘storage situations’ was encountered in the villages: from large-scale storage in purpose-built buildings adjacent to houses to relatively small

wooden boxes inside houses. The large built storage facilities (*ambar*) usually represent double-storey wooden buildings with the main storage space comprising sizeable compartments extending over both levels; the compartments are entered from the top level (from above) and are used for separate storage of einkorn and emmer spikelets, which have been dried and are awaiting use as food, fodder or seed corn (Fig. 4). Wooden crates/trunks (*sandık, ahşap sandık*) for additional storage are located on the upper storey (Fig. 5), while other plant products such as fruits and vegetables are sometimes spread on the floor or are hung on the walls (Fig. 6). As an illustration of approximate capacity of the storage buildings, in one of larger *ambar* in the village of Izbeli Çiftliği around 4 tons of wheat could be stored; some 700 kg of einkorn in the form of spikelet is kept here as seed corn (depending on total size of fields owned by the household which could vary over time), and the rest is more than sufficient for a family of five to use over one year. The remaining produce is intended for fodder or for sale, while there is also a certain loss due to grain infestation and damp. Apparently, the quantities of stored wheat are well beyond average family requirements, but this is due to the fact that a considerable part of the produce is fed to dairy cows (which are often 'penned' on the ground floor of houses, in order to keep them warm).

Inside houses, cereals in the form of grain in the spikelet, cleaned grain and flour are stored in wooden crates/trunks (*sandık, ahşap sandık*) similar to those in *ambar*, and are used as and when needed. Despite the restricted capacity of the storage facility (e.g. a wooden crate of about 500 kg capacity is commonly used for keeping flour - Fig. 7), the quantities of stored plant products are still relatively high, compared to large-scale (*ambar*-type) storage, and this is again because some of the semi-clean grain (grain in the spikelet) is fed to animals. Also, small-scale storage to be shared within a household is characteristic of subsistence families, in contrast to farmers producing for sale as well as for their own use.

The small-scale nature of plant storage also extends to vegetables grown in gardens near houses and fruits and nuts grown in orchards or collected from the wild. These products are in different ways stored for the use in winter: underground storage of potatoes and carrots in large pits near houses, pickling of vegetables, drying and/or conserving fruits (Fig. 8); some farmers specialise in growing vegetables for sale in peak seasons.

Discussion

Although it is not always possible to make meaningful comparisons between the present-day agricultural practices and those suggested for the past, some important observations have been made within this study. Clearly, apart from the cultivation of 'ancient' wheats - einkorn and emmer, very few traditional agricultu-

ral practices survive in Kastamonu, and they are strongly challenged by modern technologies and mechanised farming. The majority of the off-site crop cultivation activities (sowing, field-maintenance, and harvest) are carried out using machines, as well as threshing of harvested crop, whereas dehusking and grinding for bulgur and flour takes place in traditional (medieval) water-powered mills.

Several aspects covered by the study provided us with a basis for further consideration and interpretation of archaeological data from Çatalhöyük, and observations related to storage practices and facilities are particularly useful. Comparison of the archaeological storage evidence with the ethnographic examples in Kastamonu suggests comparable 'pantry' (small-scale) storage for daily consumption within the household over the year. Ethnographic examples also show that wild plant collection and agricultural production are not mutually exclusive and that wild and 'domestic' foods are often kept in the same storage area. Houses at Çatalhöyük display significant variation in bin capacity as do present-day farming households in Turkey, depending on the life history of the occupying family and the intended use of the products (e.g. to be sold at markets/in shops - Giuliani *et al*. 2009). On the other hand, the main contrast between the archaeological and ethnographical situation is reflected in the large-scale storage capacities for surplus crops in Kastamonu; no evidence of any large built structure intended for crop storage, or of large-scale storage in general, has been found at Çatalhöyük.

In Kastamonu, wheat and wheat products have extremely high socio-cultural importance in many aspects of daily communal life, along their route from wheat fields to family mealtime reunions, to wheat market stands. Though beyond the scope of the study, the observation of agricultural routine provided some clues on the social aspect of farming, since certain stages in the process involve social interaction among those doing the work. For example, individual households usually help each other in seasons of 'heavy' labour, e.g. at harvest time, which is an opportunity for them to exchange knowledge, news, and experience. Furthermore, as well as the food procurement and processing, eating also has social meanings, and family-based meals are of considerable importance. Food can be understood as a social category, and wheat-based food, particularly bulgur, has a specific role in local cuisine in much of Turkey – it has been estimated that the average annual consumption of bulgur in Turkey is approximately 12 kg per person (Ünal and Sacilik 2011, 894).

As in many parts of the world, folk knowledge and especially its cultural background in Turkey are rapidly disappearing resource due to industrialisation (modernisation of agricultural production) and socio-economic changes (e.g. migration of village population to towns). The fieldwork in Kastamonu has shown that the knowledge of 'old' farming techniques is still present in the memory of farmers, and examples of agricultural structures and equipment/tools (e.g. mills, threshing sledges, baskets) used in the past are occasionally found as

part of museum displays. Otherwise, they are simply seen as decaying remnants of traditional rural life. Therefore, the ethnographic and ethnoarchaeological studies in Turkey represent invaluable sources of information, such as the above mentioned work of G. Hillman, F. Ertuğ and other similar accounts on vernacular knowledge of crop and wild plant use, traditional skills and techniques. They are essential as datasets to which archaeological evidence can be compared, and constitute a basis for analogical inferences about material culture and culture as a whole, and the relationships between the two (cf. David and Kramer 2001), while they at the same time they represent an important contribution to preserving the declining traditional knowledge and practices.

Conclusions

Results of the ethnoarchaeological survey of certain elements of "traditional" farming in Kastamonu province, north Turkey have been presented. As part of the fieldwork, several villages where einkorn and emmer are still grown have been visited and agricultural techniques, processes and structures documented. The observations have been compared to the relevant aspects of crop husbandry at Neolithic Çatalhöyük, where einkorn and emmer were staple crops, and important differences and similarities between Neolithic and present-day contexts have been revealed, particularly regarding methods, scale and facilities for storage of crop and wild plant products. The general abandonment of traditional farming techniques, and extensive use of mechanisation, as well as gradual disappearance of traditional knowledge have been noted, calling for more effort to be put at recording and publicising various aspects of life in rural areas in Turkey.

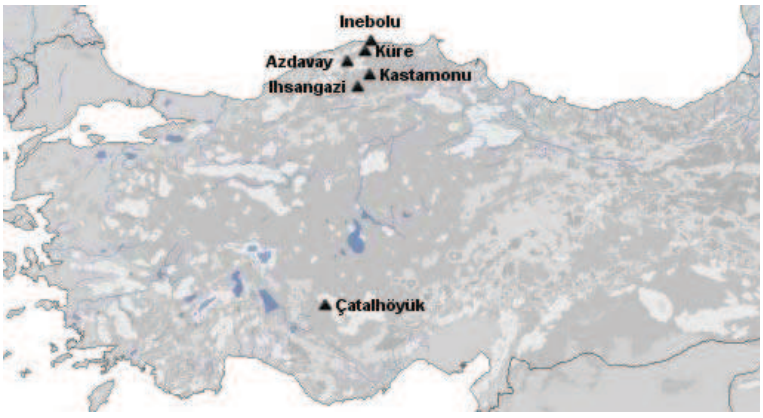

Fig. 1 – Map showing the districts of Kastamonu province where the visited villages are located; the location of Çatalhöyük also shown

Village (*Köyü*)	District
Zümrüt	Azdavay
Koçcuğaz	Ihsangazi
Çatalyazı	Ihsangazi
Korupınar	Inebolu
Izbeli Çiftliği	Kastamonu
Çatak	Kastamonu
Örencik	Kastamonu
Sipahiler	Küre

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Упоредна анализа "традиционалне" земљорадње у провинцији Кастамону (Турска) и трагова неолитске пољопривреде на локалитету Чатал Хијик (централна Анадолија)

Раније етноархеолошке студије показале су да се у појединим руралним деловима Анадолије и дан данас гаје древне пољопривредне врсте уз коришћење техника и метода које вероватно вуку корене још из неолита. Тим археоботаничара ангажован на локалитету Чатал Хијик посетио је неколико села у покрајини Кастамону у северној Турској, где се понегде гаје једнозрна и двозрна пшеница – главне пољопривредне културе на неолитском локалитету Чатал Хијик. Упоредна анализа археолошких и етнографских елемената открива сличности у погледу складиштења пољопривредних производа у оквиру стамбених објеката – у питању су мање количине жита у облику полуочишћеног зрна (зрно у плеви), крупно млевеног зрна (булгур) и брашна. Количина производа који се чувају у кућним оставама отприлике одговара претпостављеном капацитету силоса откривеним у кућама Чатал Хијика, што можда указује и на сличности у намени производа – за исхрану чланова домаћинства током године. Упадљива је разлика када су у питању велика складишта – амбари, у којима се чувају знатне количине пшенице намењене махом за

продају, али и за сточну храну и као семе за наредну сетву. На Чатал Хијику до сада нису откривене грађевине које би могле да имају исту или сличну намену. Запажена је све значајнија улога механизације у производном процесу и напуштање "старих" култура и техника.

Кључне речи: етноархеологија, неолит, Анадолија, пољопривреда, складиштење житарица

Analyse comparative de l'agriculture "traditionnelle" dans la province de Kastamonu, Turquie, et des traces d'agriculture du néolithique sur le site de Çatalhöyük, Anatolie centrale

Des études ethnoarchéologiques antérieures ont montré que dans certaines parties rurales de l'Anatolie des espèces agricoles anciennes étaient toujours cultivées à l'aide des techniques et des méthodes dont les origines remontent probablement au néolithique. L'équipe de archéobotanistes engagée sur le site de Çatalhöyük a visité plusieurs villages dans la province de Kastamonu dans la Turquie du nord, où parfois sont cultivés l'engrain et l'amidonnier – les principales cultures agricoles sur le site néolithique Çatalhöyük. L'analyse comparative des éléments archéologiques et ethnographiques révèle des ressemblances au sujet du stockage des produits agricoles à l'intérieur des habitations – il s'agit de petites quantités de blé sous forme de grains partiellement égrenés (grains en sons), de grain grossièrement moulu (boulghour) et de farine. La quantité des produits qui sont conservés dans des remises correspond approximativement à la capacité supposée des silos découverts dans des maisons de Çatalhöyük, ce qui rend peut-être compte des ressemblances dans la finalité des produits – pour l'alimentation des membres du ménage au cours de l'année. La différence est sensible quand il s'agit de grandes réserves – magasins, dans lesquels sont conservées d'importantes quantités de blé destinées principalement à la vente, mais aussi pour l'alimentation du bétail et comme grain pour les semailles suivantes. Sur le site de Çatalhöyük jusqu'ici n'ont pas été découverts des édifices pouvant avoir une finalité semblable. Un rôle de plus en plus important de la mécanisation dans le processus de production et l'abandon des cultures et techniques "anciennes"a été relevé.

Mots clés: ethnoarchéologie, néolithe, Anatolie, agriculture

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