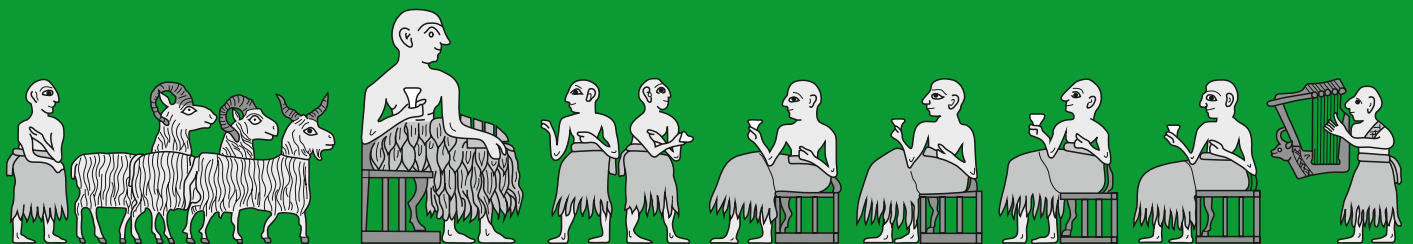


# Offfa

Von Sylt bis Kastanas  
Festschrift für  
Helmut Johannes Kroll



69/70 • 2012/13



# Offa

Berichte und Mitteilungen zur Urgeschichte, Frühgeschichte  
und Mittelalterarchäologie

Band 69/70 • 2012/13

WACHHOLTZ VERLAG NEUMÜNSTER

Herausgegeben  
vom Institut für Ur- und Frühgeschichte der Christian-Albrechts-Universität zu Kiel  
und dem Archäologischen Landesmuseum der Stiftung Schleswig-Holsteinische Landesmuseen Schloss Gottorf, Schleswig  
sowie dem Archäologischen Landesamt Schleswig-Holstein, Schleswig  
durch

CLAUS VON CARNAP-BORNHEIM, Schleswig, WALTER DÖRFLER, WIEBKE KIRLEIS,  
JOHANNES MÜLLER und ULRICH MÜLLER, alle Kiel

Gedruckt mit Unterstützung durch den  
Verein zur Förderung des Archäologischen Landesmuseums e.V., Schleswig

Die wissenschaftlichen Beiträge in der Offa-Zeitschrift unterliegen  
einem Peer-Review durch auswärtige Gutachter.

Redaktion: Anke Wesse, Kiel  
Technische Redaktion und Umschlagentwurf: Holger Dieterich, Kiel

ISSN 0078-3714  
ISBN 978 3 52901264 8

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Wachholtz Verlag Neumünster 2013

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Die Zeitschrift OFFA trägt den Namen eines vermutlich sagenhaften Königs der Angeln. In dem altenglischen Merkversgedicht *Widsith* („Weitfahrer“ oder „Weitfahrt“), von dem Teile wahrscheinlich noch auf dem Kontinent entstanden sind, vor der Übersiedlung der Angeln, Sachsen und Jüten nach Britannien, wird er zusammen mit anderen Königen erwähnt (Zeile 35–44):

Offa herrschte über Angeln, Alewih über die Dänen;  
dieser war der kühnste aller Männer,  
nicht aber übertraf er Offa an Tapferkeit,  
sondern Offa erkämpfte sich als erster der Männer,  
in seiner Jugend, das größte Königreich;  
keiner zeigte in seinem Alter im Streit  
größere Tapferkeit. Mit seinem Schwert allein  
setzte er die Grenze gegen die Myrginger  
an der Eider fest; Angeln und Sweben hielten  
sie danach ein, wie Offa sie erkämpfte.

Offa weold Ongle, Alewih Denum.  
Se wæs þara manna modgast ealra.  
No hwæpre he ofer Offan eorlscype fremede,  
ac Offa geslog ærest monna,  
cniht wesende, cynerica mæst.  
Nænig efeneald him eorlscipe maran  
onorette. Ane sweorde  
merce gemærde wið Myrgingum  
bi Fifeldorfe. Heoldon forð sibban,  
Engle & Swæfe, swa hit Offa geslog.

In dem altenglischen Heldenepos *Beowulf* (7.–10. Jahrhundert) berichtet der Erzähler, daß die Königstochter Thryth (oder Modthrytho) Offa heiratet (Zeile 1955–1960a):

den besten des Menschengeschlechts  
zwischen den beiden Meeren; denn Offa wurde  
wegen seiner Geschenke (an seine Krieger)  
und seiner Kampfthaten, der speerkühne Mann,  
weithin gerühmt. In Weisheit herrschte er  
über sein Erbland.

ealles moncynnes mīne zefræze  
þ(one) sēlestan bī sām twēonum,  
eormencynnes; forðam Offa ll wæs  
zeofum ond zūðum, zārcēne man,  
wīde zeweorðod, wīsdōme hēold  
ēðel sīnne;

Übersetzung aus dem Altenglischen von Dietrich Jäger,  
Englisches Seminar der Christian-Albrechts-Universität zu Kiel

Festschrift für  
HELMUT JOHANNES KROLL  
zum 65. Geburtstag



Мелісма





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## Healing with Plants in Prehistoric Northern Greece A Contribution from Archaeobotany

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### Introduction

Plants have probably sustained populations of the genus *Homo* in prehistoric Greece since its appearance in the region during the Lower Palaeolithic, combined with hunted animals or gathered animal food resources. In all likelihood it is during the palaeolithic past of human societies that this interaction with the surrounding vegetation led to an acquired knowledge on plant properties in terms of nutrients and other substances including medicinal ones, a knowledge transmitted and enriched from generation to generation. The change of climate with the onset of the Holocene and the gradual transformation of the landscape through the expansion of arboreal vegetation, the opening up of fields and pastures by Neolithic communities inhabiting a dense mixed oak woodland, the presence of river forests and marshes, generated a rich flora comprising numerous aromatic and medicinal plants awaiting to be discovered and used by people inhabiting northern Greece.

During the course of time, together with the new cereals and pulse species brought into cultivation in the Bronze Age, new plants with medicinal, aromatic, psychoactive properties and oil yielding seeds started being used in the area. It is very likely that during the Neolithic and the Bronze Age the foundations of later pharmacopoeia are to be found. Before the doctors of the ancient Greco-Roman world gathered in their writings the available knowledge on the properties of plants, including 'recipes' for the preparation of drugs, we know from myths and the Homeric poems that plants and plant mixtures were

used to kill with their poison, to alleviate pain or grief, to cause amnesia (VOLANAKIS 2004), and that famous mythical witches like Circe, a minor goddess, and her niece, princess Medea, possessed the knowledge of the properties of plants, using them for good or evil, as well as the knowledge of communicating with the 'underworld'.

In a time and place for which written sources are unavailable, the archaeobotanical record constitutes perhaps our main 'text book' that may allow the exploration of plants used in prehistoric healing practices. The archaeobotanical identification of plants with healing properties introduces us to the world of prehistoric senses of smell, pleasure and pain, a world highly subjective and defined within specific cultural contexts (cf. HAMILAKIS 2002), therefore difficult to approach.

Archaeobotanical evidence, retrieved during the last three decades, published and unpublished, provides the basis for an exploration of plants with medicinal, aromatic and psychoactive properties and their possible uses in healing practices among Neolithic and Bronze Age communities inhabiting northern Greece<sup>1</sup>. Other lines of evidence like textual evidence, pottery residue analysis and plant representations would have been helpful in this respect, but, unlike the south of Greece (MÖBIUS 1933; TZIGOUNAKI/PERNA 2001; SARPAKI 2001; ANDREADAKI-VLAZAKI 2000) they are either lacking from the north or at a very preliminary stage of research.

\* I am deeply grateful to Ken and Diana Wardle for kind permission to publish the images of the two pots from Assiros Toumba in Figure 6, to Vassilis Fyntikoglou for his help with ancient medical texts and to my postgraduate student Chrysa Petridou for taking the *Papaver somniferum* seed photos from Archondiko. Aris Mentzos and Tim Insoll kindly provided various papers.

<sup>1</sup> Our honoured colleague, Helmut Kroll, has pioneered in this respect by dedicating a special section on medicinal plants in his publication on the plant remains from Kastanas in 1983, a site in the region of central Macedonia in northern Greece, close to his beloved Thessaloniki, where one can choose from a wide array of medicinal plants in the old markets of the city.

## Medicinal, aromatic and mind altering plant species in Neolithic and Bronze Age northern Greece

Archaeobotanical research in northern Greece over the last 30 years has revealed a wide range of plant species and genera. Among those, several possess medicinal and aromatic properties and a few can cause altered states of consciousness, they could therefore have been used in healing practices. Identifying those plants used in this context is a rather difficult exercise. First of all there is no straightforward way of knowing that such plants, when encountered in the archaeobotanical record, were indeed intended for such use. For example ethnographic case studies have shown that not all plants with medicinal or hallucinogenic properties growing in a region are used for this purpose (e.g. SCHULTES/HOFMANN 1992). Moreover, the plants of this broad category of medicinal plants found in an archaeobotanical assemblage may not represent the whole range of plants involved in healing. As most of the species found at Greek sites are represented mainly by seeds, preserved in a charred state, it is possible that plant species used for medicinal purposes in other forms, for example as roots, leaves, flowers etc. may have a limited chance of preservation in the form of charred plant remains. Preservation conditions other than charring, e.g. waterlogging, would have had a greater potential for revealing plant parts used in the context of healing, yet so far such remains have not been published from northern Greece. Moreover, even if used, these plants may still prove difficult to find in the archaeobotanical record: They could have been harvested upon demand and the remains deposited in contexts unrelated to house fires.

The above observations lead us to a third cautionary note that concerns our interpretive classifications of the archaeobotanical data: Plants that may be classified under food or oil plants could have also constituted important medicinal plants of a prehistoric community under investigation. Flax for example, as its specific epithet *usitatissimum* eloquently demonstrates, would fall under several categories, including medicinal (KISLEV et al. 2011; VALAMOTI 2011). Many medicinal plants can also be used for food or *vice versa*, a clear-cut distinction between food and medicine is not always possible as one realizes when examining the properties of plants such as barley, grape vine, fig, flax etc. It is commonly the case in traditional recipes of medicinal foods that the basic ingredient is also a staple, for example a gruel made of emmer wheat in Ethiopia (D'ANDREA/MITIKU HAILE 2002) or the gruel made of barley (*πιτσάνη*) in ancient Greece (MICHA-LAMPAKI 1984).

Besides the medicinal properties of certain cultivated or wild plants used as foodstuffs, it is very plausible that medicinal plants were harvested from the wild exclusively for these properties. Many among

Table 1. List of species identified from Neolithic and Bronze Age settlements in northern Greece with medicinal and/or aromatic properties (after VALAMOTI 2001).

Cultivated Crop	Fruit / Nut	Wild / Weed
<i>Vicia ervilia</i>	<i>Quercus</i> spp.	<i>Urtica</i> spp.
<i>Papaver somniferum</i>	<i>Ficus carica</i>	<i>Polygonum aviculare</i>
<i>Camelina sativa</i>	<i>Rubus fruticosus</i> agg.	<i>Rumex acetosella</i>
<i>Brassica nigra/rapa</i>	<i>Rosa</i> spp.	<i>Stellaria</i> spp.
<i>Linum usitatissimum</i>	<i>Fragaria vesca</i>	<i>Agrostemma githago</i>
<i>Hordeum vulgare</i>	<i>Prunus cf. spinosa</i>	<i>Ranunculus</i> spp.
	<i>Prunus amygdalus</i>	<i>Fumaria</i> spp.
	<i>Pistacia terebinthus</i>	<i>Glaucium</i> spp.
	<i>Vitis vinifera</i>	<i>Capparis</i> spp.
	<i>Cornus mas</i>	<i>Reseda cf. luteola</i>
	<i>Sambucus ebulus</i>	<i>Aphanes</i> spp.
	<i>Sambucus nigra</i>	<i>Potentilla</i> spp.
		<i>Trifolium</i> spp.
		<i>Melilotus</i> spp.
		<i>Medicago</i> spp.
		<i>Malva</i> spp.
		<i>Thymelea</i> spp.
		<i>Hypericum</i> spp.
		<i>Anagalis cf. arvensis</i>
		<i>Galium</i> spp.
		<i>Heliotropium</i> spp.
		<i>Verbena officinalis</i>
		<i>Ajuca</i> spp.
		<i>Teucrium</i> spp.
		<i>Hyoscyamus</i> spp.
		<i>Physalis alkenkengi</i>
		<i>Solanum nigrum</i>
		<i>Plantago lanceolata</i> type
		<i>Centaurea</i> spp.
		<i>Allium</i> spp.
		<i>Avena</i> spp.

the wild species could represent weeds of cultivation of cereals and pulses as they are found in association with them, or the remains of grazed plants, ending up in animal dung subsequently used as fuel (VALAMOTI 2004). When a concentration of the seeds of a plant with medicinal or aromatic properties is found in a storage context, its intentional harvest and storage provides a clear indication for its use but not of the specific use(s) it was intended for. Moreover, as one can gather from the ethnographic record, our interpretive groupings of plants into categories such as food, oil, medicine, aromatic, hallucinogenic, may not correspond to those used in Neolithic or Bronze Age times, thus a careful examination of plant prop-

Table 2. Prehistoric sites of northern Greece where the species stated have been found in dense, pure concentrations of more than 50 seeds/nuts.

Site	Period	Terebinth	Coriander	Linseed	Lallemantia	Opium Poppy	Grape pressings
Makriyalos	Late Neolithic	x	.	x	.	.	.
Arkadikos	Final Neolithic	.	.	x	.	.	.
Dikili Tash	Final Neolithic	.	.	x	.	.	x
Mandalo	Final Neolithic	.	.	x	.	.	.
Archondiko	Early Bronze Age	.	.	x	x	x	.
Mandalo	Early Bronze Age	.	.	.	x	.	.
Sitagroi	Early Bronze Age	.	x	.	.	.	.
Assiros	Late Bronze Age	.	.	.	x	x	.
Kastanas	Late Bronze Age	.	.	x	x	x	.
Toumba Thessalonikis	Late Bronze Age	.	.	.	.	.	x
Karabournaki	Iron Age	.	.	.	.	.	x

erties, archaeological context and depositional processes may reveal unexpected uses of plants, normally interpreted as food or fodder for example.

Among the species identified (cultivated and wild) in the archaeobotanical record of northern Greece 49 possess medicinal and/or aromatic properties (Table 1; VALAMOTI 2001). The list of potentially medicinal/aromatic plants of northern Greece can be limited to a few species only if we eliminate species that are present in very small numbers and low frequencies. The remaining species are the following: barley (*Hordeum vulgare*), bitter vetch (*Vicia ervilia*), linseed (*Linum usitatissimum*), oak (*Quercus* spp.), fig (*Ficus carica*), grape vine (*Vitis vinifera*), elder (*Sambucus* sp.), blackberry (*Rubus fruticosus* agg.), wild strawberry (*Fragaria vesca*), Cornelian cherry (*Cornus mas*), opium poppy (*Papaver somniferum*), mustard (*Brassica rapa/nigra*), gold-of-pleasure (*Camelina sativa*), medic (*Medicago* spp.), terebinth (*Pistacia cf. terebinthus*), *Lallemantia*, St John's wort (*Hypericum* spp.), coriander (*Coriandrum sativum*). Some of these species correspond to raw materials for luxury substances like oil or even foodstuffs, yet their use in healing at the same time is equally plausible.

This paper focuses on a selection of those species occurring at several sites, in more or less pure, dense concentrations (Table 2), species primarily associated with uses other than staple food, including medicinal ones. In the context of prehistoric healing the paper will extensively discuss terebinth (*Pistacia terebinthus*), coriander (*Coriandrum sativum*), flax (*Linum usitatissimum*), *Lallemantia*, opium poppy (*Papaver somniferum*) and the grape vine (*Vitis vinifera*), i. e. plants that can be both medicinal and either aromatic, or oil yielding or associated with altered states of consciousness and healing. It is very likely that at

least these plants, and probably many more, by virtue of their special properties may have played a significant part in prehistoric healing practices.

#### Terebinth (*Pistacia cf. terebinthus*)

Charred nuts of *Pistacia* from northern Greece have been identified as *Pistacia cf. terebinthus*. Based on the morphological characteristics of the nuts it is unlikely that the finds in the north of Greece correspond to *P. lentiscus*, but *Pistacia atlantica* cannot be excluded from the identification. Our identification as *P. Terebinthus*, however, is probably correct, as *P. atlantica* is not a component of the flora of northern Greece. The distinction between the two species, in any case, is unimportant for the evaluation of the uses of the plant as both are closely related to each other as regards their properties and uses (NIELSEN 1986). The nuts are edible (Fig. 1), used for oil extraction in the Aegean (e.g. Chios and the Cyclades, MEROUSIS 2012; DELATOLA-FOSKOLOU 2006) and Turkey; the medicinal and aromatic oil of terebinth has culinary and cosmetic uses while the resin included in its woody parts has medicinal and aromatic properties, known already from antiquity (e.g. GENNADIOS 1914; ÖZCAN 2004; MARCOPOULOS 1965; MEROUSIS 2012). Terebinth was apparently a favourite incense burnt by ancient Greeks (MAJNO 1975). The resin of this plant was considered by Theophrastus the best due to its perfume and its ability to set easily (POLUNIN/HUXLEY 1987; HUXLEY/TAYLOR 1989). It also constituted a regular element of various medicinal remedies found in ancient medical texts. Dioskourides for example mentions that it was used to treat scorpion bites, skin ulcers and pain. It is also a regular ingredient of 'recipes' used for the prepa-



Fig. 1. *Pistacia terebinthus* plant growing in Chalkidiki, northern Greece, July 2008.

ration of the Holy Myrrh of the Orthodox church (MENEVISOGLOU 1972).

Terebinth resin was a product widely circulated in the trade routes of the Eastern Mediterranean during the Late Bronze Age (NIELSEN 1986; KNAPP 1991; ARTZY 1994). Resin of this plant has been found at the Ulu Burun shipwreck, dated to the 14<sup>th</sup> century B.C. (HALDANE 1993). The most likely place of origin proposed for this find is considered to be Galilee. In Linear B tablets found at Knossos, the word *KI-TA-NO* originally considered by VENTRIS/CHADWICK (1973) as referring to some sort of aromatic or spice, was later interpreted as indicative of terebinth resin (MELENA 1974; KNAPP 1991). Certain researchers argue that this resin was produced in the Syro-palestine area from where it was exported to the Aegean, basing their arguments on the Ulu Burun finds (ibid.; ARTZY 1994). SARPAKI (2001) does not agree with Knapp's interpretation of *KI-TA-NO* and she associates the word *KI-TA-NO* with ladanum. Recently the earlier identification of *KI-TA-NO* as terebinth has received renewed interest, this time the plant be-

ing considered as a potential oil source for Bronze Age perfume industries of southern Greece (MEROUSIS 2012).

This species, known from other prehistoric sites of Greece, has been found at most sites of northern Greece located close to the coast such as Early Neolithic Giannitsa B (VALAMOTI 1995) and Late Neolithic Thermi (VALAMOTI 1992). The most abundant finds of *P. terebinthus*, however, have been so far found at Makriyalos in a more or less pure concentration consisting of many nuts from the interior of a pit close to the so called megaron of the site, dated to the 5<sup>th</sup> millennium B.C. A medicinal use for the nuts found at Makriyalos is a strong possibility as will be seen in the following section.

#### Coriander (*Coriandrum sativum* L.)

The species is native to western Asia and north Africa and nowadays it is used as aromatic in cooking and pastry. Coriander has antibacterial properties



Fig. 2. Charred linseed from Makriyalos, Late Neolithic, first half of 5<sup>th</sup> millennium B.C.

(SILVA et al. 2011) and can be used against stomach pain and ulcers, diarrhea and other digestive disorders (BOWN 1995; MAROUFI et al. 2010). It is known for its insect repellent properties thanks to which it has been used in the past for the protection of stored crops (PANAGIOTAKOPOULOU et al. 1995). In the Late Bronze Age palaces of southern Greece, coriander constitutes an important element in the perfume industry as the Linear B inscriptions from Pylos indicate (SHELMERDINE 1985). In northern Greece, a relatively pure and rich concentration of coriander has been found at Sitagroi in eastern Macedonia (RENFREW 1973; 2003). Of the remaining sites from northern Greece it has only been found in one sample represented by a single seed at Mandalo (VALAMOTI/JONES 2003). Both finds are dated to the end of the 4<sup>th</sup> and the beginning of the 3<sup>rd</sup> millennium B.C., i. e. the Early Bronze Age.

#### Linseed (*Linum usitatissimum*)

Although flax is usually associated with fibre, food or oil, it has been known for its medicinal properties since ancient times. Flax seeds are mentioned in various medicinal recipes in the work of Dioscorides as well as in recent publications of traditional plant-based medicinal remedies (GENNADIOS 1914; BOWN 1995; KISLEV et al. 2011; VALAMOTI 2011). Many treatments in the work of Dioscorides involve the use of flax seed, together with other ingredients, externally as cataplasms against pain, scorpion bites and vaginal infections or internally to treat stomach and bowel problems. Of course linseed can also be used for oil production. Linseed oil is rich in omega three fatty acids and it is edible when extracted using a cold water method (SER-



Fig. 3. Grape pips and pressings from Dikili Tash, northern Greece, end of 5<sup>th</sup> millennium B.C.

PICO/WHITE 2000; KAPOOR/HUANG 2006). Linseed has been found at several Neolithic and Bronze Age sites in northern Greece since the middle Neolithic while rich concentrations of the plant are found at Late Neolithic Makriyalos (Fig. 2), Arkadikos and Dikili Tash and Bronze Age Archondiko, Kastanas and Assiros (VALAMOTI 2004; 2011; VALAMOTI et al. 2008; KROLL 1983; JONES/VALAMOTI 2005).

#### Grape vine (*Vitis vinifera*)

It may appear odd to consider the grape vine in relation to prehistoric healing, yet there are many later sources that include wine or vinegar, as ingredients of medical remedies, also as a medium for obtaining infusions from plants with medicinal properties (e. g. PHILUMENUS). Concentrated grape juice, *petimezi*, is also traditionally known as a medicine against cough, throat pain, mouth ulcers, stomach pain (DE-LATOLA-FOSKOLOU 2006; CASTILLA et al. 2006). The grape vine is very widespread in northern Greece since the appearance of early farming communities in the area, initially represented by a few grape pips, later identified in rich, dense pure concentrations, occasionally consisting of grape pressings (Fig. 3; VALAMOTI 2009; VALAMOTI et al. in press). These grape pressings provide a clear indication for the extraction of grape juice, the earliest being represented by old (VALAMOTI et al. 2007) and more recent finds at the Final Neolithic site of Dikili Tash (VALAMOTI et al. in press). The finds originate from a house destroyed by fire during a major conflagration episode occurring sometime around 4200 B.C. Together with numerous finds of small cups and vessels suitable for decanting liquids, it provides a strong indication for wine making as early as the 5<sup>th</sup> millennium B.C. in

the north Aegean. Besides the medicinal properties attributed to various liquids based on grape juice, the inebriation caused by alcohol consumption has been linked to altered states of consciousness achieved in ritual, religious or funerary contexts of southern Greece (e.g. HAMILAKIS 1998; COLLARD 2011). The likely association between altered states of consciousness and healing practices in the past has been suggested by various authorities, based on ancient texts and the anthropological literature on the subject (MERLIN 2003; SHERRATT 1991 a; 1991 b; 1995; RUDGLEY 1993). This aspect of wine consumption is further discussed below.

### Opium poppy (*Papaver somniferum*)

Most authorities consider that opium poppy was domesticated in the western Mediterranean, as the earliest archaeobotanical finds of this species originate in that area (ZOHARY et al. 2012). Others consider *Papaver somniferum* indigenous to central Europe (POLUNIN 1969). Opium poppy seeds are used for their oil, widely used in different parts of the world for culinary and cosmetic purposes (AZCAN et al. 2004; ÖZCAN/ATALAY 2006). Unlike the seeds, the opium poppy head is rich in potent alkaloids which were widely known since the Bronze Age in Greece and elsewhere in the Eastern Mediterranean according to KRITIKOS/PAPADAKI (1963), who gathered a wealth of artefactual, textual, and pictorial references to the opium poppy. More recently, a comprehensive examination of archaeobotanical evidence for the plant in Europe is provided by MERLIN (2003), again underlining its long usage in Europe probably for its ability to induce altered states of consciousness.

Opium poppy, due to the alkaloids it contains (morphine, codeine, papaverine etc.) possesses analgesic and hallucinogenic properties. Because of the effects of these substances to human senses, this species has been associated with ritual consumption among prehistoric communities of Europe prior to the arrival of alcoholic drinks, i.e. wine and beer (SHERRATT 1991 a; 1995). This view is based among other things on the presence of pots interpreted as braziers potentially used for burning opium. According to Sherratt, such substances, due to their psychoactive properties (for example euphoria and hypnosis) and the particular sensory effects, held a particular meaning and position in rituals during prehistoric times, possibly considered a means to access other worlds (SHERRATT 1991 b). This species is closely connected to Minoan worship as is indicated by the representation of opium poppy heads attached to the head of a figurine at Gazi in Crete and dated in the middle of the 2<sup>nd</sup> millennium B.C. (MARINATOS 1937; KRITIKOS/PAPADAKI 1963).

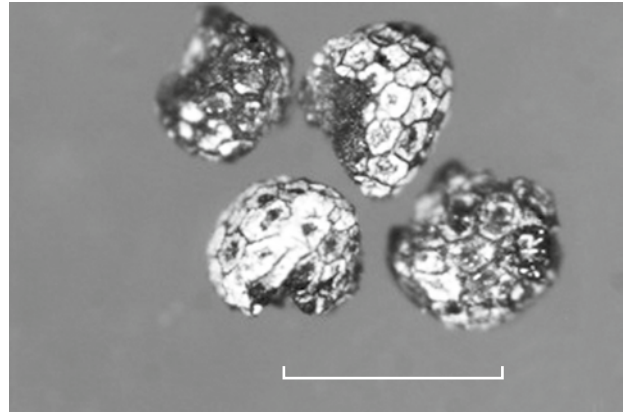


Fig. 4. Opium poppy seeds from the Late Bronze Age layers excavated at Archondiko, 2<sup>nd</sup> millennium B.C.

The circulation of opium in liquid form from Cyprus to Egypt during the Late Bronze Age is indicated by the systematic export from the island of a particular type of clay vessel, the body of which corresponds to the head of the opium poppy, occasionally decorated by pale whitish lines, suggestive of the cuts performed on unripe opium poppy heads for the extraction of opium and interpreted as the representation of an opium poppy head (MERRILLEES 1962). This suggestion is supported by recent analyses by infrared mass spectroscopy performed on the remains of such pots where a component of the molecule of papaverine was identified (MERRILLEES/EVANS 1989). Recently, a contextual analysis of the distribution of these pots in Bronze Age Cyprus has suggested the ritualised consumption of opium and alcohol by elites (COLLARD 2011). The same study has questioned the use of a bone object interpreted as a pipe for opium 1200 B.C. (KARAGEORGHIS 1976). The relationship between opium poppy and religious worship is encountered in early historic times as is indicated by ivory opium poppy heads found at the Heraion on Samos and dated to the 8<sup>th</sup> century B.C. (e.g. KYRIELEIS 1983).

It is highly likely that the medicinal properties of opium poppy were widely known not only in Greece but in the wider area of the Eastern Mediterranean in the past. In ancient Egypt it is mentioned in medical texts (KRITIKOS/PAPADAKI 1963; NUNN 1996; ROSSO 2010). Certain authorities argue that it was some sort of panacea, an equivalent to modern aspirin (MERRILLEES 1962).

Based on the archaeobotanical finds from northern Greece, opium poppy is encountered at very low numbers at the Final Neolithic/Early Bronze Age site of Mandalo in Macedonia, in a layer dated to approximately the second half of the 5<sup>th</sup> millennium B.C. (VALAMOTI/JONES 2003). This find from Mandalo is of particular interest as it is among the earliest





Fig. 5. *Lallelantia* seed conglomeration from Archondiko, end of 3<sup>rd</sup> millennium B.C.

in Greece and the eastern Mediterranean in general. The small number of seeds, however, does not allow us to examine whether this species was among those used at the site. On the other hand, given its unlikely presence as a crop weed and the very limited chances of preservation of opium poppy seeds, as recently shown through experimental investigations (MÄRKLE/RÖSCH 2008), these few early finds could be considered an indication for the use of opium poppy in Final Neolithic northern Greece, at least in certain settlements.

Opium poppy seeds have also recently been found at the site of Archondiko, not far from Mandalo. Archondiko has been systematically investigated for plant remains over the last 15 years and the examination of samples belonging to the Late Bronze Age (2<sup>nd</sup> millennium B.C.) has revealed the presence of a few opium poppy seeds among the debris of a burnt destruction layer consisting mainly of pure cereal grain concentrations, presumably stored (Fig. 4; VALAMOTI et al. in press). In total 139 opium poppy seeds have been found. Although their number is still small, their presence suggested the knowledge of this species in this particular area of northern Greece since the Neolithic and during the Bronze Age. In the same broad area where Mandalo and Ar-

chondiko are situated, further to the east, the sites of Kastanas and Assiros have also yielded finds of opium poppy falling to the 2<sup>nd</sup> millennium B.C., but slightly later than those from Archondiko (KROLL 1983; JONES/VALAMOTI 2005).

#### *Lallelantia* sp.

During the course of the Bronze Age a variety of species possessing aromatic, medicinal properties as well as oil rich seeds is encountered in the archaeobotanical record of northern Greece: *Lallelantia* sp., mustard (*Brassica rapa/nigra*) and gold-of-pleasure (*Camelina sativa*). *Brassica/Sinapis* has been found at Late Bronze Age Assiros in a rich concentration (JONES/VALAMOTI 2005) and would have constituted a very effective medicine against muscle aches and problems of the respiratory system. It is also mentioned as an emetic in large concentrations (BOWN 1995). Gold-of-pleasure belongs to the same family and is encountered in a rich concentration at Kastanas (KROLL 1983). Its oil has healing effects on ulcers and wounds (RODE 2002).

Among these species, *Lallelantia* is native to central Asia and is mentioned as a medicinal plant of the Labiatae family without more specific descriptions of its properties (RIVERA-NUNEZ/DE CASTRO 1992 a; 1992 b; PARSA 1960; NAGHIBI et al. 2005; MORTEZA-SEMNANI 2006). It is also used for oil production, its oil having similar qualities as those of linseed (HERDRICK 1972; BENEDIKT 1895; SAMADI et al. 2007). *Lallelantia* is also considered an aromatic plant and is included in the aromatic plants of Iran as it is rich in essential oils (MORTEZA-SEMNANI 2006). *Lallelantia* occurs in dense, pure concentrations at Archondiko (Fig. 5) and Assiros and in smaller quantities at Mandalo (VALAMOTI/JONES 2003) and Agios Mamas (BECKER/KROLL 2008), thus it appears in southeastern Europe and northern Greece in particular in the Early Bronze Age, continuing to be used throughout the Bronze Age period. It has been suggested that its introduction to northern Greece may have been linked to the trade in metals with the East and tin in particular (VALAMOTI/JONES 2010).

#### The context of healing with plants in prehistoric northern Greece

The preceding overview of the archaeobotanical record of northern Greece has revealed a wide range of plants potentially used for their medicinal and/or aromatic properties as well as for the ability of some among them to induce altered states of consciousness. We now turn to the context of consuming these plants in relation to healing among prehistoric so-

cieties of Greece. Unlike modern western attitudes to healing, whereby this is achieved through the intake of the active substance, in prehistoric times healing may have involved many more elements. A brief overview of ethnographic case studies of healing with plants among pre-industrial societies can be highly illuminating in this respect.

A deep knowledge of plants used as food or for their narcotic, stimulant and medicinal properties by indigenous people is observed by Claude Lévi-Strauss in his book *La Pensée Sauvage* among for example the Hopi, Navaho, Seminoles of America and the Subanum of South Philippines, a knowledge accompanied by a sophisticated terminology used to distinguish different parts of the plants which correspond to different properties, nutritional or medicinal (LÉVI-STRAUSS 1962). Moreover, medicinal properties of the plants used to heal in a given community are intrinsically linked to the community's classification systems and their associations. To the western mind these may seem totally arbitrary, for example the association of *Artemisia* with woman, moon and night, treatment of menstrual problems and difficult childbirths (ibid.). Recent ethnographic studies in several cases in Latin America support these observations and demonstrate the close connection of medicinal plants, the cosmological order and the realm of the symbolic within each community (MARTINEZ 2010). Analogous observations have also been made for the Talensi of Ghana in Africa (INSOLL 2011 a).

As regards the choice of a particular plant medicine for treating a specific illness, smell and taste play a very important role. The sense of smell may have had a survival value as the recognition of a strong smelling plant in most cases would coincide with a plant with a physiological effect (MAJNO 1975). Both smell and taste also appear to act as a mnemonic device for the transmission of medicinal plant knowledge (MOLARES/LADIO 2010). The perception and cultural interpretation of smell and taste of plants is an important criterion among indigenous people for the selection of the plant for healing, as is emphasized by studies in Latin America (ibid.; HEINRICH 1998). The perceptions of taste and odour formed within each human being, as well as perceptions regarding the medicinal properties of a plant are characterised not only by subjectivity but also diversity depending on the social or ethnic group the person belongs to as is indicated by research in America, Europe and Asia (JOHNS/KEEN 1985; SHEPARD 2004; PIERONI/TORRY 2007; MOLARES/LADIO 2010).

It is also evident that plants are not perceived simply as 'containers' of active substances that can cure, but also as active players in the healing process, therefore their harvest may be regulated by strict rules and rituals (e.g. Indian tribes of north America, LÉVI-STRAUSS 1962; ancient Greek 'ρίζοτόμοι' - rootcutters, SCARBOROUGH 1991). Moreover, plants form just one component of the healing procedure which also includes the involvement of spirits, gods, ancestors, the shaman and rituals performed by the shaman or healer, a person who knows the properties of plants, can contact the world of spirits

and possesses the knowledge of, and authority for, performing the ritual. The relevant literature concerning hunter-gatherer communities emphasizes the relationship between healing and the interaction of healers/shamans with the world of spirits. In this way, they ensure equilibrium between the two worlds and healing is closely linked to this interaction, in most cases involving altered states of consciousness induced among other things by psychoactive plants (ELIADE 1964; SHERRATT 1991 a; 1991 b; RUDGLEY 1993; PEARSON 2002; HAYDEN 2003; DANAWAY 2010; MERLIN 2003; COLLARD 2011).

Healing in the context of prehistoric societies of Greece has not received much attention. It has been indirectly touched upon within the context of prehistoric Europe (SHERRATT 1991 a; 1991 b) and the Late Bronze Age of Eastern Mediterranean in relation to the consumption of substances like alcohol and opium (COLLARD 2011) or oil (FAPPAS 2009). A contextual examination of the archaeobotanical finds is of crucial importance if inferences are to be made as regards the context of consumption of 'medicinal' plants as well as the context of preparation of healing remedies or performance of healing practices. As INSOLL (2010) emphasises, to isolate 'medicine' from its overall context would be to separate it from other material domains of potential archaeological relevance, such as the residues of sacrifice, diet, and taboo (ibid.).

In this respect, the terebinth concentration from Late Neolithic Makriyalos, presented in the preceding section, may provide an interesting case. The pit sample where terebinth was found also contained fig seeds, lentil, flax as well as a wide range of plant genera and species known for their medicinal properties: *Urtica* sp., Solanaceae, *Anagallis arvensis*, *Trigonella* sp., indet. Compositae, *Brassica rapa/nigra*, *Camelina* sp., *Medicago* sp., *Hypericum* sp. With the exception perhaps of lentils, all other species found in this particular pit from Makriyalos do possess medicinal properties used in traditional remedies (BOWN 1995; GENNADIOS 1914; HERBAL REMEDIES 1996). For example *Anagallis arvensis* is used as a diuretic and an antipyretic, while a mixture of linseed and *Brassica/Sinapis* seeds is recommended for chest problems. If the *Hypericum* seeds found correspond to *Hypericum perforatum*, it would imply the presence of a widely used medicinal plant for the treatment of wounds externally and as an infusion internally against depression. Given the exceptional archaeobotanical composition of this pit at Makriyalos, compared to the remaining pits from the site and considering the properties of the plant species contained, it seems very likely that this particular context contained plants involved in healing practices, perhaps the remains of medicinal treatments and that terebinth was one of the components of these remedies

(VALAMOTI 2001; 2011). Interestingly, this same pit is also rather exceptional in another way: It contained the largest concentration of *Spondylus* shell objects from the site (PAPPA 2008). *Spondylus* shell objects, produced in Neolithic Greece, are closely associated with exchange networks reaching northern Europe and they might have corresponded to some form of luxury item ascribing special status or powers to the owners or users (e.g. WHITTLE 1996). At Makriyalos, *Spondylus* shell seems to be associated with burial practices (PAPPA/VEROPOULIDOU 2011). The location of the pit at the entrance of a megaroid building, although the latter may postdate the pit, adds one more element of 'special' function as the pit appears spatially associated with a structure different to the others excavated at Makriyalos.

The association of healing with the interaction of ancestors or the dead, is attested in the ethnographic record (see COLLARD 2011 for a review of the relevant literature, also INSOLL 2011 a). Associations between objects like figurines or bracelets, medicines and the ancestors and ritual practice in the context of healing have been observed ethnographically in Africa and detected archaeologically in northern Ghana, dated to approximately 1200 A.D.: The 'activation' or empowerment of a figurine, bracelet, pot or other object in the context of healing is achieved by bringing it in contact with medicinal substances derived partly from plants (KANKPEYENG et al. 2011; INSOLL 2011 b; INSOLL et al. 2012). Could plant and artefactual associations observed for the pit at Neolithic Makriyalos point towards a special function related to healing rituals involving the interaction with the realm of the dead? In light of the above it is certainly a type of context worth exploring further in the future.

Further to the north-east of Makriyalos, at Dikili Tash towards the end of the 5<sup>th</sup> millennium B.C., a house collapsed by a major conflagration episode that encapsulated perhaps wine making in the process. At Dikili Tash, although no medicinal plants in the strict sense of the word have been identified, with the exception perhaps of linseed, the unique find of the remains of wine making in 'House 1' could have been related to healing practices. Moreover, there is a strong possibility that wine making was under way in House 1 when it caught fire: The house was full of crops, harvested and stored, as well as fruit and nuts harvested in autumn. This would suggest that fire broke out during winter or spring. The pressed grapes, however, found in large quantities in this house, in association with coarse ware pottery, could suggest that fermentation was actually under way when the house burnt down. This would certainly narrow down the timing of its destruction, sometime after grape harvest and before wine was ready. If this scenario is supported by further archaeologi-

cal finds, currently under study, it would also be interesting to see if House 1 was exceptional in its inventory of various artefacts, besides the grape finds. It certainly did shelter the containers for a liquid and the cups probably used for drinking it. Examples from the near East (COLLARD 2011) and from Egypt (SZPAKOWSKA 2003) show that contact with the gods or ancestors was made possible among other things through alcohol consumption and the resulting state of inebriation. Inebriation induced by the consumption of alcohol was sought after in banquets or religious rituals organised probably by the elites (e.g. the *marzḥ festival*) – occasionally aiming to interact with ancestors – in different areas of the Eastern Mediterranean world, for example among the Hittites and Egyptians (COLLARD 2011).

Alcohol consumption in the context of ancestor worship or mortuary rituals has been discussed for Bronze Age Crete (HAMILAKIS 1998) and Bronze Age Cyprus (COLLARD 2011). In northern Greece there appears to be a long tradition of grape juice extraction on the basis of charred plant remains as grape pressings also occur at Late Bronze Age Toumba Thessaloniki and Iron Age Karabournaki in Thessaloniki (VALAMOTI 2009). Moreover, cups and serving sets are not only encountered at Dikili Tash, but also at several other prehistoric sites in the north and of later periods. During the Late Bronze Age, the traditional local etiquette of alcohol consumption seems to change, incorporating pottery from the Mycenaean south. It is possible that changes in the drinking sets were accompanied by changes in the drinking etiquette as well as the social goals negotiated and achieved through alcohol consumption (ANDREOU 2003). Could wine consumption in the context of Late Neolithic and Bronze Age communities in the north have been related to altered states of consciousness, related in turn to healing practices? Could House 1 and wine preparation at Dikili Tash have been associated with some form of a shaman/healer in possession of the knowledge of fermentation of grape juice and in a position to communicate with spirits, ancestors or gods? Despite a strong mark for the preparation and consumption of wine in prehistoric northern Greece, its association with healing can only be of a speculative nature as there is at present no study examining in depth the contextual associations between archaeobotanical remains, drinking sets and other spatially associated artefacts and architecture.

Turning to opium poppy, the plant *par excellence* associated with altered states of consciousness within the context of Bronze Age communities of the Eastern Mediterranean, the charred seeds identified from northern Greece are eloquent for the presence of the plant in the region during the Bronze Age and probably since the Late Neolithic. Contextual infor-

mation, however, provides no indications for its use in a healing context, neither have chemical analyses of pottery residues from the region shown traces of opium. The stored seeds from *Kastanas* could represent clean seeds kept for next year's harvest or clean grain intended for the extraction of oil or seeds used for spicing up dishes of the Late Bronze Age cuisine of northern Greece. It would seem surprising, however, if people of the region cultivated a plant and at the same time remained ignorant of the potent properties of the milk oozing out of the unripe capsules.

The archaeobotanical record discussed here has highlighted the presence of aromatic plants, like terebinth and coriander, as well as oil yielding plants, in particular during the Bronze Age, like linseed, *Lallemantia*, mustard, poppy and gold-of-pleasure. Although the available evidence does not allow us to identify activities related to the production and circulation of perfumes, analogous to those suggested by Linear B tablets of the Bronze Age palaces in the south (SHELMERDINE 1985; D'AGATA 1997), the presence of these aromatic and oil yielding plants in northern Greece indicates that the necessary ingredients were readily available. In the archaeobotanical record aromatic plants, of course, are less prominent than oil plants. This, in part at least, may be due to the fact that aromatic substances are usually extracted from flowers and therefore have very limited chances of archaeobotanical preservation. Recent interdisciplinary research in northern Greece, combining ceramics, pottery residue analysis and archaeobotanical remains, has indicated that unguents and oils were being produced and placed within specialized containers, decorated in a specific type of pot (Fig. 6), kantharoid amphoriskoi with incised pottery decoration (ANDREOU et al. in press). The low percentage of these pots among the ceramic assemblages of Late Bronze Age settlements of northern Greece, their decoration and long distance connections with areas to the north of the Danube, have led to the suggestion that these pots may have been used in ceremonies and rituals, including mortuary ones (ibid.). A precious content (oil, perhaps perfumed) within a rare container would further underline the symbolic significance of the content and the contexts of its use which may have also involved healing rituals.

Healing could have employed the use of aromatic plants and/or oil and the association between aromatic oils and healing, especially in ritual contexts, may not be far-fetched although up to the present little investigation took place especially in northern Greece. The Mycenaean Palaces of southern Greece were very much involved in the production of perfumed oil which was sent to shrines as offerings to gods and it might have been used in contexts similar to those observed among the Hittites, Assyri-



Fig. 6. Comb-incised and paste-filled pottery from Assiros, photo on the right c. 1350–1300 B.C. Photo courtesy of Ken and Diana Wardle. Not to scale.

ans and Egyptians during the Bronze Age (FAPPAS 2009). Texts from Hattuša, Ugarit and Nippur mention the use of oil, perfumed or unperfumed in healing rituals performed by male or female healers who were also in charge of their preparation. The use of oil, mainly by spreading on parts of the body, was believed to alleviate from the negative consequences, illness or weakness (FAPPAS 2009).

The use of oils and aromatics for healing observed in these Late Bronze Age cultures of the Near East and Anatolia is also known from early Christianity, a practice adopted from the Judean tradition. The preparation of the Holy Myrrh in the Orthodox Church, prepared since the early years of Christianity, is highly illuminating in this respect, not as a direct analogy but as an instructive case study where healing, oil, perfume and religious ritual are interconnected. The Holy Myrrh is prepared following a very well prescribed ritual which regulates the ingredients, the people involved in its preparation, the words spoken during its preparation, its recipient and place of storage as well as the uses it can be put to and the timing of its preparation (MENEVISOGLOU 1972). Its ingredients consist of, or are derived from, a wide range of plants that are medicinal, aromatic or both, and oil. Its uses comprise contact with the skin immediately after baptism, the consecration of ritual paces or objects as well as medicinal uses (ibid.). The powers associated with the Holy Myrrh include safeguarding the body and soul of evil spirits and energies by repelling them.

In the light of the preceding discussion, the production and use of oils, including perfumed ones, within the context of Bronze Age societies in northern Greece, may have had a very important role in healing practices and rituals while the people involved in their production and manipulation might have held a special position among the members of these communities. In the north, however, unlike Bronze Age Cyprus, Crete or the Peloponnese

– where there is strong evidence for the presence of elites, hierarchies and centralized control – hierarchies, if present, are not easily detectable through the archaeological record (ANDREOU 2003). Thus although at a generalized level we may envisage the

presence of a healer, a woman or a man, knowledgeable in the properties of the plants discussed in the preceding section and their uses in healing, the context within which such a person or persons would have operated remains obscure.

### Conclusions

In a world without pharmacies, where the ‘pharmacy’ is nature itself, the instinct and the accumulated knowledge and experience, transmitted from generation to generation, plants would have provided one of the means with which people coped with illness, physical or mental. Healing, as can be gleaned from the ethnographic record and ancient written sources has a wider sense than the mere use of a plant for its active medicinal ingredient, rather it involves the combined use of plants with medicinal effects, plants that induce altered states of consciousness, perfumes (including smoke), rituals and communication with the spiritual world. Prehistoric ‘healing’ plants, with the medicinal and aromatic substances they contained, would have provided cures, relief from pain, the restoration of good health, satisfaction to the senses and perhaps the means to communicate with spirits or ancestors during the Neolithic and the Bronze Age of northern Greece. Of course, the reverse could also have been true, their active elements could have caused pain or even lead to death. Some of these plants might have been involved in healing, not only by means of their active substances but also by virtue of their cultural significance, symbolism and associations within each specific Neolithic or Bronze Age community of the region.

Plant species with potentially medicinal or aromatic uses, identified in the archaeobotanical record of northern Greece, growing on prehistoric fields or pastures, or even in herbal gardens, would have possessed the same properties as they do today. Although the archaeobotanical record cannot prove that these properties were known to the prehistoric inhabitants of the region and used by them, it is

most likely that this was the case for most and most certainly for those plants we find in rich, pure concentrations. Indications for the need to use various cures do exist, although limited, in the osteoarchaeological record (TRANTAPHYLLOU 2001) though not all health problems would have left their traces on the human bones. Although a ‘complete prehistoric herbal’ of northern Greece is beyond the scope of this paper and several plants have been excluded from detailed discussion, it is clear that the list of medicinal, aromatic and oil plants is long and the prehistoric inhabitants of northern Greece had a range of alternative remedies to choose from in healing. It is of course difficult to prove that they were put to such use, but in the light of the ethnographic observations presented above, it is very likely that this was indeed the case. Some of the tiny seeds we encounter in our archaeobotanical samples may have constituted important elements in the means certain people may have exercised authority, contributing at the same time to the maintenance of community well-being and social cohesion.

An investigation of prehistoric healing practices requires not only rich archaeobotanical data of plants with active ingredients, but also a detailed contextual examination of the archaeological finds potentially related to healing, including plant remains as well as information on artefacts, structures, spatial associations. An interdisciplinary approach of the archaeological record, liberated from stereotypical interpretations of the finds as houses, storage and refuse areas, food, fodder and crop weed, may be in a position to approach other – essential to existence – aspects of prehistoric lives, including that of healing.

## Summary

Archaeobotanical evidence from northern Greece, retrieved during the last three decades, published and unpublished, provides the basis for an exploration of plants with medicinal, aromatic and psychoactive properties and their possible uses in healing practices among Neolithic and Bronze Age communities of the area. This paper focuses on certain species identified from sites excavated in the region that can be both medicinal and either aromatic, or oil yielding or associated with altered states of consciousness and healing. These are terebinth (*Pistacia terebinthus*), coriander (*Coriandrum sativum*), flax (*Linum usitatissimum*), *Lallemantia*, opium poppy (*Papaver somniferum*) and the grape vine (*Vitis vinifera*). It is very likely that at least these plants, and probably many more, by virtue of their special properties may have played a significant part in prehistoric healing practices.

Case studies from a pit rich in terebinth at Late Neolithic Makriyalos, a house full of pressed grapes at Late Neolithic Dikili Tash and Late Bronze Age sites rich in oil plants and incised, rare pots provide

the basis for a discussion of prehistoric healing with plants. An investigation of prehistoric healing practices requires not only rich archaeobotanical data of plants with active ingredients but also a detailed contextual examination of other archaeological finds, such as artefacts, structures and their spatial associations. In light of ethnographic information, it is suggested that healing in the context of prehistoric communities of the region may have involved many more elements than the mere use of 'medicinal' plants, such as special artefacts, rituals and contacts with the dead.

Grouping of plants into categories such as food, oil, medicine, aromatic, hallucinogenic, based on our perception of plant properties, may not necessarily correspond to those used in Neolithic or Bronze Age times, thus a contextual examination of the archaeobotanical record, liberated from stereotypical interpretations of the finds as food, fodder and crop weed, may open up pathways to approach another, essential to existence, aspect of prehistoric lives, that of healing.

## Zusammenfassung

Archäobotanische Funde der letzten drei Jahrzehnte aus Nordgriechenland (publizierte und nicht veröffentlichte) bilden die Grundlage für die vorliegende Untersuchung von Pflanzen mit medizinischen, aromatischen und psychoaktiven Eigenschaften und ihre mögliche Verwendung zu Heilzwecken in neolithischen und bronzezeitlichen Gemeinschaften dieser Region. Der Artikel konzentriert sich auf bestimmte Arten, die aus lokalen Grabungen stammen und sowohl medizinische als auch aromatische Eigenschaften aufweisen oder zur Ölgewinnung dienen oder mit Bewusstseinsveränderungen oder Heilzwecken in Verbindung stehen: Terpentin-Pistazie (*Pistacia terebinthus*), Koriander (*Coriandrum sativum*), Lein (*Linum usitatissimum*), *Lallemantia*, Schlafmohn (*Papaver somniferum*) und die Weinrebe (*Vitis vinifera*). Sehr wahrscheinlich haben diese Pflanzen – und vermutlich noch viele andere – aufgrund ihrer besonderen Eigenschaften eine bedeutende Rolle bei urgeschichtlichen Heilmethoden gespielt.

Eine an Terpentin-Pistazie reiche spätneolithische Grube aus Makriyalos, ein spätneolithisches Haus von Dikili Tash voller gepresster Trauben und spätbronzezeitliche Fundplätze mit vielen Ölpflanzen

sowie selten vorkommende verzierte Gefäße liefern die Grundlage für eine Diskussion über pflanzliche urgeschichtliche Heilmethoden. Eine Untersuchung prähistorischer Heilpraktiken erfordert nicht nur umfangreiches archäobotanisches Material, sondern auch eine detaillierte, kontextbezogene Bearbeitung anderer archäologischer Funde wie Objekte und Befunde sowie ihre räumliche Beziehung zueinander. Aufgrund ethnografischer Beobachtungen ist davon auszugehen, dass die Heilmethoden urgeschichtlicher Gemeinschaften in dieser Region mehr Elemente umfassten als die bloße Verwendung von Heilpflanzen, wie besondere Gerätschaften, Rituale und Kontakte mit den Toten.

Die Gruppierung von Pflanzen aus unserer heutigen Sicht in die Kategorien Nahrung, Öl, Medizin, Duft, Halluzinogene muss nicht unbedingt den Vorstellungen im Neolithikum und der Bronzezeit entsprechen. Eine kontextbezogene Untersuchung archäologischer Funde und Befunde frei von stereotypen Einteilungen nach Nahrung, Viehfutter und Unkraut könnte den Blick freigeben auf einen anderen, existentiellen Aspekt urgeschichtlichen Lebens: die Heilmethoden.

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