

THE ARCHAEOBOTANICAL RECORDS OF WILD PLANTS FROM THE NEOLITHIC AND CHALCOLITHIC SETTLEMENTS IN BULGARIA

Tzvetana Popova

National Institute of Archaeology and
the Museum of the Bulgarian Academy of Science

Hanna Hristova

University of Sofia “Sv. Kliment Ohridski”, Sofia

Abstract: *In prehistoric times, humans combined a variety of food provision strategies and in order to ensure a balanced diet. These strategies largely depended upon locally available natural resources. Even after animal husbandry and agriculture emerged, strategies such as wild plant gathering and hunting remained reliable methods of food procurement. The information about gathering of wild edible plants in prehistoric times in Bulgaria derives from the finds of wild plant seeds and fruit stones in archaeobotanical samples. The archaeobotanical data on wild plants and fruits show a regular presence of Cornelian cherry tree, grapes, walnut, hazelnuts, acorns, and seeds from different shrubby plants and herbs. The evidence clearly demonstrates that, during the Neolithic and Chalcolithic times in the territory of Bulgaria, agricultural societies made use of different resources to ensure regular and diverse food supplies.*

Key words: *palaeoenvironment, subsistence economy, gathering, food supplies, wild plants, Neolithic and Chalcolithic settlements.*

Preliminary report

UDC: 903”634/636”(497.2)

902.2(497.2)

903:561(497.2)

Received: 15.01.2019.

Accepted: 01.02.2019.

Tzvetana Popova

National Institute of Archaeology and
the Museum of the Bulgarian Academy of Science
paleobotani_tz@abv.bg

Hanna Hristova

University of Sofia “Sv. Kliment Ohridski”, Sofia
hkh@mail.bg

АРХЕОБОТАНИЧКИ НАЛАЗИ ДИВЉИХ БИЉНИХ ВРСТА НА НЕОЛИТСКИМ И ЕНЕОЛИТСКИМ ЛОКАЛИТЕТИМА У ПРАИСТОРИЈИ БУГАРСКЕ

Цветана Попова

Национален Археологически институт с музеј

София

Хана Христова

Софийски универзитет „Св. Климент Охридски“

София

Апстракт: У праисторијским временима, људи су комбиновали различитије начине набављања хране како би осигурали уравнотежену исхрану. Ове стваријеије у великој мери су зависиле од локално достујујних ресурса. Чак и након појаве узгоја животиња и земљорадње, стваријеије као што су прикуљање дивљих биљних врста и лов остале су поуздан метод за прибављање хране. Подаци о скуљању дивљих јестивих биљних врста у праисторији на тлу Бујарске појичу од семена дивљих биљака и плодова и показују редовно присуство дрена, јрожја, ораха, лешника, жира, као и семење разноврсних жбунастих биљака и трава. Подаци јасно показују да су током неолитској и енеолитској периода на територији Бујарске земљорадничка друштва користила различитије ресурсе како би осигурали редовну и разноврсну исхрану.

Кључне речи: палеоокружење, економија хране, скуљање, извори хране, дивље биљне врсте, неолитска и енеолитска насеља.

Претходно саопштење
УДК: 903"634/636"(497.2)
902.2(497.2)
903:561(497.2)

Примљено: 15.01.2019.
Прихваћено: 01.02.2019.

Цветана Попова
Национални Институт за археологију и
Музеј Бугарске Академије наука
paleobotani_tz@abv.bg

Хана Христова
Универзитет "Св. Климент Охридски", Софија
hkh@mail.bg

INTRODUCTION

Food consumption is a basic biological activity, necessary for the survival of every living organism, and food is the most important source of energy. In satisfying the primary needs and following the instinct for survival, man created a system of rules for extracting, preserving, processing and consumption of foodstuffs. Thus, food, food preparation and eating are elements of a structured behaviour of every human community and often are key aspects of the cultural identity. They lie at the intersection of nature and culture and represent the basis of daily life, as well as of festive events, which unite or, sometimes, divide the partakers and affect their relationships. Although agriculture is of major significance for human subsistence and labour organization, collection of wild plants was an important and constant aspect of life in early agricultural communities. The provision of alimentary resources additional to produced food (i.e. cultivated crops) presupposes some form of mobility and good knowledge of the flora of a given micro-region. Foraging strategies enabled gradual accumulation of this knowledge and humans learned about nutritive potential of different plant species and their parts and the developed their use. In Bulgaria, the information about prehistoric gathering of wild plants is limited. It is based on, generally rare, findings of seeds and stones of wild plants that are usually fragmented and charred.

In this paper, the focus is on plant species identified as gathered during the Neolithic and Chalcolithic. First, the available palaeovegetation evidence is presented for the periods in question. This is followed by the list of wild plants seen as gathered by the prehistoric communities of the time. Finally, some selected floristic information is provided for these species and the sites listed at which they were recorded.

PALAEOENVIRONMENT DURING THE NEOLITHIC AND CHALCOLITHIC PERIOD IN BULGARIA

Vegetation is a basic component of the natural environment. Significant changes in the vegetation cover in Europe took place during the Quaternary when the northern parts of the continent and the mountains were covered by glaciers. Towards the end of the mid-Holocene, the environmental changes were linked with the economic activity of man. Large-scale deforestation and grazing started, as result of which vast forested areas were cleared of trees. Thus, the character of the flora was changed by the replacement of natural vegetation with cultivated species.

According to Weninger et al. (2006: 401–420), an abrupt climate change occurred around 8200 cal. B.P. that caused drying-up in the western parts of the eastern Mediterranean, which facilitated the fast spread of the Neolithic to south-eastern Europe. In the valley of the Struma river in Bulgaria, a number of Neolithic settlements developed, whose residents practiced farming. A substantial change in the composition of the vegetation in south-western Bulgaria happened at the time of the Holocene Climatic Optimum when the general warming trend culminated. The Climatic Optimum was preceded by an abrupt cold phase at around 8200 cal. B.P. in the northern hemisphere that lasted for 160 years. In south-western Bulgaria, the spread of coniferous forests with dominant pine and fir commenced after 8000 cal. B.P., replacing the birch communities and partly those of oak. The increased use of oak forests by humans during the following epochs led to the clearance of oak forests, also performed in order to free-up land for crop cultivation and pasture for cattle grazing.

At the beginning of the Climatic Optimum, mixed oak forests developed at medium altitudes in south-eastern Bulgaria (the mountains of Rila, Northern Pirin and Western Rhodopes) with lime-tree (*Tilia*), elm (*Ulmus*), maple (*Acer*), ash (*Fraxinus*), European hornbeam (*Carpinus betulus*) and with hazel (*Corylus*) in the partially deforested areas. Forests composed of birch and Scots pine (*Pinus sylvestris*) developed in high altitudes. To the north of the Balkan mountains grew mixed oak forests that included birch (*Betula*), lime-tree and hazel, while pine, fir (*Abies*) and juniper (*Juniperus*) had limited distribution (Tonkov et al. 2008: 185–191). The stage when human presence is most clearly manifested in the pollen diagrams is connected with the sudden expansion of juniper around 2800/2700 cal. B.P. and through Sub-Atlantic period. In many places at the time, juniper formed the upper boundary of the forest. The degradation started with cutting down of coniferous forests for fuel and timber, and to clear up land for cultivation and pasture. This led to

the spread of beech (*Fagus*) (Tonkov et al. 2008: 185–191). In the Iron Age, the presence of anthropogenic indicators increased considerably. After 2600 cal. B.P. (c. 600 cal. B.C.), the expansion of beech continued and intensified, e.g. in Osogovska Mountain around 2200 cal. B.P. (c. 200 cal. B.C.) (Tonkov et al. 2008: 185–191).

The charred wood record from the studied settlements confirms the predominance of oak forests in the lower mountain belt during the Holocene Climatic Optimum. Remains of trees from the rose family (*Rosaceae*), hazel, Cornelian cherry (*Cornus mas*), hornbeam (*Carpinus*), maple and elm are ubiquitous. The presence of willow (*Salix*), alder (*Alnus*), poplar (*Populus*) suggest that these species were an integral part plant communities growing along rivers and that they were also used by people. The charcoal collections from the archaeological sites of Kamenska Chuka and Koprivlen include the wood from fir, Scots pine and juniper. This is in line with the palynological evidence of the spread of fir and pine forests during Sub-Boreal period.

With the increase in anthropogenic activity, forest and grass vegetation decreased significantly, whereas arable weed communities were on the rise. Our data for Thrace, for example, show the dominance of oak wood during the studied periods, with a considerable increase observed for the Bronze Age. This is, obviously, a consequence of clearing of the land for grazing and crop cultivation. The palynological and archaeobotanical data indicate intensive use of land for arable production (Tonkov et al. 2008: 185–191). By the end of the Bronze Age, a considerable presence of wheat, barley and rye is noted in the pollen diagrams from the high mountains in Bulgaria. The appearance of ruderal plants such as *Artemisia*, *Plantago lanceolata*, *Rumex*, *Cirsium* in the archaeobotanical record reflects clearing of land for grazing purposes, i.e. extensive cattle breeding in the Bronze Age (Popova and Bojilova 1995: 391–399).

The expansion of hazel (*Corylus avellana*) and hornbeam (*Carpinus betulus*) happened due to large-scale felling of oak by the Chalcolithic communities, after which secondary plant communities developed (Lazarova 1995: 47–67). The culmination of the Holocene Climatic Optimum (from the end of 8000 cal B.C to the end of 5000 cal B.C.) and the favourable living conditions led to the population growth and more extensive land use – as evidenced at the archaeobotanically studied settlements of Malak Preslavetz and Durankulak for instance. The increased presence of cultivated cereals and of anthropogenic indicators, such as *Plantago lanceolata*, *P. media*, *P. major*, *Polygonum aviculare*, and *Centaurea cyanus* is documented for the Bronze Age (5000–3500 uncal B.P., 3000–1500 B.C.) and the Early Iron Age. This aligns with the Sub-Atlantic period (3000–2500 B.P., 1200 B.C.),

as documented in the pollen diagram from the lake of Srebarna (Lazarova 1995: 47–67).

WILD PLANTS USED DURING THE NEOLITHIC AND CHALCOLITHIC PERIOD IN BULGARIA

Archaeobotanical data from the analysed sites show frequent presence of the most common domesticated cereals and leguminous species: einkorn (*Triticum monococcum*), emmer (*Triticum dicoccum*), free-threshing wheat (*Triticum aestivum/durum*), club wheat (*Triticum compactum*), spelt (*Triticum spelta*), barley (*Hordeum vulgare* var. *nudum* and *Hordeum vulgare* var. *vulgare*); bitter vetch (*Vicia ervilia*), grasspea (*Lathyrus sativa*), pea (*Pisum sativum*) and lentil (*Lens culinaris*). Some of the sites also yielded a diverse repertoire of wild edible species like non-cultivated fruit trees, shrubs and herbs. Their remains include completely or partially charred acorns and hazelnuts, fruit stones of wild cherries, plums and Cornelian cherry, and seeds of common grape vine, hawthorn, wild rose, blackberry, strawberry, elderberry. These plants were part of the natural vegetative cover in the surrounding of the settlements. It is possible that some of the fruit and nuts were collected by chance together with the wood cut for fuel, timber or other purposes. However, the presence of these remains in discrete archaeological contexts in significant quantities, sometimes even dominating the assemblages, strongly indicates their consumption or different usage, such as in preparation of cosmetics, ointments, paints. Some of them, as acorns for example, could have been used as fodder. Other were maybe valued for their healing potential or were perhaps collected as nutritious food in years of poor crop harvest. Of special interest are herbaceous plants, for instance fat-hen or goosefoot (*Chenopodium album*), knotgrass and buckwheat (*Polygonum* sp.), sorrel (*Rumex acetosa*), etc., whose young leaves can be consumed as food or used as fodder, and their seeds can be ground to flour and used in preparation of bread or gruels (Popova 2009: 71–166).

The information presented below is mostly based on the remains collected at prehistoric settlements situated in western and south-western Bulgaria (the Struma river valley), and in Thrace. This regions have transitional, continental to Mediterranean climate that offers favourable growing conditions for rich and diverse vegetation. Table 1 shows the presence/absence of the plants potentially gathered at the Neolithic and Chalcolithic settlements in the territory of Bulgaria.

Table 1 – Wild gathered plants documented at prehistoric settlements in Bulgaria
 Табела 1 – Дивље сакупљане биљне врсте регистроване на праисторијским локалитетима у Бугарској

Plant species / Биљна врста	acorn / жир	comelian cherry / древјина	plum or cherry / ринглов	wild grapevine / дивље грожђе	wild cherry / дивља трешња	hazelnut / лешник	blackberry or raspberry / купина или малина	strawberry / шумска јагода	dwarf elder / апповина	elder / зова	sorrel / кисељак	fat-hen / пепељуга	common knotgrass / троскот
Site / Локалитет	<i>Quercus</i> sp.	<i>Cornus mas</i>	<i>Prunus</i> sp.	<i>Vitis vinifera</i> ssp. <i>sylvestris</i> Gmell.	<i>Prunus</i> cf. <i>cerasus</i> L.	<i>Corylus</i> <i>avellana</i> L.	<i>Rubus</i> sp.	<i>Fragaria</i> <i>vesca</i> L.	<i>Sambucus</i> <i>ebullus</i> L.	<i>Sambucus</i> <i>nigra</i> L.	<i>Rumex</i> <i>acetosella</i> L.	<i>Chenopodium</i> <i>album</i> L.	<i>Polygonum</i> <i>aviculare</i> L.
Zagortzi													
Voden		•	•		•							•	
Tatul	•	•											
Samevo													•
Sokol		•											
Orlitza		•			•								•
Mursalevo												•	
Ivanovo	•	•											
Bersin										•		•	
Bikovo										•		•	
Hotnitsa	•	•	•						•				
Karanovo	•	•	•	•	•						•		•
Galabnik	•	•		•						•			
Drinovo													
Eleshnitsa				•									
Durankulak	•	•	•	•							•		•
Кар.	•	•	•	•				•			•		•
Dimitrievo		•	•						•				
Koprivetz		•	•						•				
Kovachevo		•	•	•	•				•		•		•
M. Preslavetz				•									
Yabalkovo	•			•	•						•		
Slatina		•											
Samovodene		•	•	•			•				•		•
Orlovetz												•	
Ok. Bolnitsa	•											•	
Ovcharovo		•											
Varhari		•											

FLORISTIC AND ARCHAEOBOTANICAL INFORMATION FOR THE DOCUMENTED WILD-GATHERED PLANTS

TREES WITH EDIBLE FRUIT

Quercus sp. – oak

This is one of the most widely spread tree in the territory of Bulgarian and its different species have grown here since distant past. The numerous oak species constitute the main plant formation in the Old World – especially in the regions with temperate and Mediterranean climate. The species *Quercus coccifera* L. and *Quercus ilex* are typical, especially for Mediterranean vegetation. *Quercus robur* and *Quercus petraea* Matt. Liebl. are widespread in the regions of Europe with moderate climate, while *Quercus brantii* Lindley and *Quercus ithaburensis* Decke are dominant in forests of the Near East (Zohary and Hopf 2000: 1–316). Most of the oak species produce large quantities of acorns at the end of summer. The size of acorns is, to a great extent, dependant on the temperature. In temperate zones, acorns are smaller in size compared to those in the Near East, where they reach lengths of 5–7 cm and widths of 2.0–2.5 cm. Several of these species are found in the territory of Bulgaria and they require different climatic conditions. *Quercus coccifera* species is found on hills in parts of the country with mild, warm conditions. In Southern Macedonia and in Western Thrace, this species is the main source of fuel and timber. *Quercus cerris* L. grows mainly on high mountains slopes. *Quercus conferta* Kit. is found not only in the lower mountain slopes but also in the lowlands along the Balkan mountain. *Quercus sessiliflora* Salisb. – „winter oak” – occurs both in the lowlands and in lower parts of the mountain ranges. *Quercus pedunculata* Ehch. – „summer oak” – grows in plains and river valleys. Its acorns were often used as food supplement, mostly in autumn. When there was shortage or loss of wheat yield, acorns would be milled together with wheat grain and turned into flour from which bread was made. They were also often used as preferred food for pigs.

Charred remains of acorns are frequently encountered in Neolithic and Bronze Age layers in the Near East, the Mediterranean Basin and the Balkan Peninsula. Acorn finds are present in many prehistoric settlements in Bulgaria, in the form of fragments or halves of fruit, or even as whole fruit. The most prominent find is the burnt store of about 4 kg of acorns found at the tell settlement of Hotnitza near the town of Veliko Tarnovo (Popova 2008: 189–194). They were probably kept as food for pigs, since large stores of wheat grain were discovered within this settlement. Some smaller quantities of acorns,

probably representing alimantal supply, were identified at the tell settlements in the villages of Yunatsite and Dyadovo, both dating from the Bronze Age (Popova 1991: 69–72). Hajnalova (1975: 303–314) came across a significant amount of acorns at the tell settlement of Golyamo Deltchevo.

Coryllus avellana L. – common hazel

Common hazel (*Coryllus avellana* L.) is a deciduous tree native to Europe and is one of the most widespread tree in Bulgaria. Almost every part of the tree was used for different purposes from the Early Neolithic onwards. The wood was managed by coppicing, and the young stems cut were used as building material (e.g. for fences). Even nowadays, common hazel is cultivated for its highly nutritious nuts, i.e. the kernel found inside the nut is edible and can be eaten raw or roasted. Remains of charred hazelnuts were discovered in different archaeological contexts at Karanovo, Kovachevo, Kapitan Dimitriev, Rakitovo (Popova 2009: 154) .

Prunus avium (L.) Moench – cherry tree

Cherry tree is often found in the vicinity of settlements, but it also grows in the wild in many parts of Bulgaria. According to Frank and Hammer (1976: 108), cultivated cherry tree probably originates from the regions around the Black Sea. The early archaeological finds date back to about 8000 BC in Anatolia. Some of the Neolithic pile dwelling settlements in Switzerland yielded remains of cherry fruit. In 74 BC, L. Lucullus (about 73 BC) first introduced it to Italy. Wild *Prunus avium* trees were a likely source of some fruit stones found in Neolithic and Bronze Age settlements of Durankulak (Popova and Bojilova 1998: 391–399), Dyadovo (Popova 1992: 238–246) and Koprivlen (Popova 2003: 279–289).

Prunus domestica L. – plum tree

Plum tree occupied forest clearances and outskirts. Fruit stones of *Prunus domestica* were found at sites from the Neolithic and Bronze Age in Switzerland,

Italy and Germany. In the territory of Bulgaria, *Prunus domestica* was recovered from the Neolithic settlements of Durankulak, Dabene, Kapitan Dimitriev, Karanovo, Kovachevo, Koprivets, Samovodene, (Marinova, 2003: 499–504.), Bronze Age settlements – Galabovo, Madrets and *Prunus spinosa* L. – in the Neolithic layer of the settlement Durankulak.

Pyrus communis (syn. *P. domestica* Med.) – pear tree

Cultivated pear is another fruit tree introduced to Europe; it is not clear wherefrom it originated. Some of its varieties are found in the Pontic region and in Colchis. There are also wild pear varieties in China. Wild pear fruit were collected long before the start of pear cultivation and they are recorded in the Neolithic and Bronze Age layers in Europe – for instance, in Switzerland, former Yugoslavia, Greece. Archaeology has not yet produced clear evidence on when the cultivation of pear tree could have begun. One can, to some extent, take into account the information provided by ancient Greek and Roman authors. Theophrastus, for example, mentions three cultural varieties for Greece, while Cato describes the method of cultivation. In Bulgaria, finds of pear have so far come from the Chalcolithic settlement of Dana Bunar, Dimitrovgrad district (unpublished data), the Bronze Age tell-settlement of Dyadovo (Popova 1992: 238–246), whereas later examples derived from Roman settlements, such as Drenkovo, Blagoevgrad district and Karanovo (unpublished data).

Cornus mas L. – Cornelian cherry tree/cornel tree

Cornus mas L. has the form of a bush or small tree. The areas of its natural distribution comprises southern and central Europe, the Black Sea region and the Caucasus Mountains. The wood is heavy, robust and resilient; nowadays it is used for production of wooden components of various objects and devices and for the creation of some small objects. The bark, branches and leaves contain yellowish pigments and are used for paint production. The bark from young branches is used for preparation of a medicine used to treat gingivitis. Dried fruits have different purposes. They are, for example, used for treating diarrhoea and malaria and they can help lower body temperature. Perhaps some of these properties of Cornelian tree and fruit were known to the prehistoric communities and were the reason for their collection (Popova 2009: 71–166)

Archaeobotanical remains of *Cornus mas* L. include charred wood and fruit stones, and completely or partially preserved dried fruits. They unambiguously point at the use of this tree in everyday life. The fruit stones were recorded at numerous Neolithic and Chalcolithic settlements in Europe, in particular in the Balkan Peninsula, for instance at the Neolithic settlement of Opovo in Serbia (Borojević 2006); and in Middle and Late Neolithic layers of Macri in Greece (Valamoti: 2004: 1–111). In Bulgaria, they are documented at many sites including Early Neolithic Kovachevo and Kapitan Dimitriev, as well as at Durankulak, Galabnik, Karanovo III-IV, Koprivets, Ovcharovo, Samovodene. Mostly wood charcoal was detected, but sometimes also whole fruit (Marinova 2001). Table 2 shows the presence of cornel-tree at sites in Bulgaria dating from different periods; it looks as if it was most frequent during the Neolithic.

Table 2 – Presence/absence of Cornelian cherry tree (*Cornus mas* L.) in different periods in Bulgaria

Табела 2 – Налази остатака дрена (*Cornus mas* L.) у различитим периодима у Бугарској

Site / Локалитет	Neolithic / Неолит	Chalcolithic / Енеолит	Bronze Age / Бронзано доба	Iron Age / Гвоздено доба	Roman period / Антика
Galabnik					
Durankulak					
Кар. Dimitriev					
Kovachevo					
Koprivetz					
Ovcharovo					
Yabalkovo					
Samovodene					
Slatina					
Orlitz					
Adata					
Galabovo					
Dyadovo					
Dabene					
Yazdach					
Ada Tepe					
Gledachevo 1					
Gledachevo 2					
Koprivlen					
Dichin					
Nicopolis ad Istrum					

Cornelian cherry tree also seems to have had a symbolic role in ritual and mythology if the ancient world, and historical texts make note of this. The tree is mentioned in Homer's *Odysseus*. In Song X, the enchantress nymph Circe feeds Odysseus and his friends with cornel and acorn fruits: „So they were penned there weeping, and before them Circe flung mast and acorns, and the fruit of the cornel tree, to eat, such things as wallowing swine are wont to feed upon.” (Homer, *Odyssey*, b. X: 240–245). In *Enquiry Into Plants* (Περὶ φυτῶν ἱστορία, Book 5; c. 350 BC–287 BC), Theophrastus states that cornel wood is „healthy as bone” and used for elaboration of spears.

SHRUBS WITH EDIBLE FRUIT

Sambucus nigra L. – elder

Elder is one of the most popular plants used in traditional medicine. All of its parts seem to be in useful. The flower has anti-inflammatory effect. Different parts of the plant are used to treat skin diseases or bites, and this is thanks to the resinous content of the plant. The fruits are also used in the preparation of blue paint, used for colouring textile.

Elder seeds were found in the Neolithic layers near the village of Vesselinovo (Arnaudov 1949: 57–73) and in the Chalcolithic layers of the tell-settlement Galabovo. At the tell-settlement Yunatsite, a significant quantity of pure elder seeds was discovered (Popova, 1991: 69–72). The seeds were also present in the layers from all studied periods of the tell-settlement Durankulak – Neolithic, Chalcolithic and Bronze Age (Popova 1995: 193–207; Popova, Bojilova 1995: 391–399). The use of elder for its healing properties is mentined in historic sources. In the *History of Vitinia*, the ancient annalist Arian tells a story of the Thracian nymph *Thrake* endowed with supernatural beauty and abilities to heal with herbs, and to revive even very ill people. Among the herbs she uses is elder.

Sambucus ebulus L. – common elder/dwarf elder

Common elder is a herbaceous plant whose natural distribution in Europe is in warm areas with moderate climate. It is a low plant that grows on fertile substrate, including heavily disturbed areas such as ruderal ground or edges or

arable fields, but also in undisturbed areas along forest edges and rivers. Plinius describes it as an indicator of highly-fertile soils and as a weed well-known to the Romans. He recommends it to be used as floor matting for in stables that house cattle. Common elder has been used in traditional medicine since ancient times. The fruit is also added to wine to provide fine red colour and as an additive in marmalades. In Europe, seeds of common elder are frequently found at prehistoric sites. In the Balkans, the remains were recovered from Bronze Age Kastanas in Greece (Kroll 1979: 67–103), the Neolithic settlement of Selevac and Opovo in Serbia (Borojević 2006) and many others. In Bulgaria, the Neolithic layers at the following sites yielded common elder seeds: the site near Vesselinovo, Kapitan Dimitriev, Karanovo II-III, Karanovo III, Koprivetz (Marinova et al. 2002: 1–11; Popova 2009: 71–166).

Vitis vinifera L. – wild (ssp. *sylvestris*) and cultivated (ssp. *vinifera*) grapevine

Wild grapevine occupies mesophilic forests and areas near swamps and rivers. In Bulgaria, it is common along the Danube and the Black Sea coast, in southwestern Bulgaria, the Thracian lowlands, in the valley of Struma, and in the Eastern and Middle Rhodope Mountains. The plant is resistant to drought and cold. *Vitis vinifera* ssp. *sylvestris* Gmel. is widespread in Europe and Western Asia. Its seeds, referred to as pips, differ in form and size to those of the cultivated grapevine. Pips of the wild form are rounded, thick and have a shorter stem/stalk. Pips of the cultivated form (*Vitis vinifera* ssp. *vinifera*) are long, slender and flat. The dimensions of wild pips fall in the following ranges: length between 3.5 and 6 mm, width 3– 4.1 mm and thickness 2.2–3.0 mm (Schoch et al. 1988: 96).

Charred grape pips were found at many prehistoric sites in Europe. The finds from Greece, former Yugoslavia, Bulgaria, Italy, Switzerland come from Neolithic sites and, on the basis of their morphology and size, they were classified as corresponding to the local wild varieties (Renfrew 1973: 243–265). They, thus, demonstrate that wild grapevine fruit was collected long before the plant was cultivated. In the Balkan Peninsula, *Vitis vinifera* ssp. *sylvestris* was also recorded in Late Paleolithic and Mesolithic layers of the Franchthi cave in Greece. Further, Kroll (1981: 161–171) discovered wild pips at a series of sites in Greece dated from the Early to the Late Neolithic. According to Valamoti (2007: 54–61), the earliest evidence of wine production dates to the 5th millennium BC. She detected archaeobotanical remains that „prove the deliberate use of grape juice, possibly for the production of a

fermented beverage, and most probably some form of wine”. The remains of grapes originate from the floor debris of one of the Late Neolithic houses at Dikili Tash, whereas several grape pips were also retrieved in earlier excavations of this site (Renfrew 1979: 243–265). The grape pips were direct-dated to 4460–4000 BC (Valamoti 2007: 54–61). Based on this, the end of the 5th millennium BC may be the time of the earliest occurrence of wine in the Aegean. The earliest finds of grape pips in the territory of Bulgaria are Neolithic, and from the site of Pompena Stanziya in the village of Malak Preslavets, the sites in villages of Drinovo and Eleshnitsa, and the sites of Kapitan Dimitriev, Karanovo (phase Karanovo II-III), Orlovets, Yabalkovo. Their morphology suggest that they belong to wild grapevine. Possibly the earliest presence of pips of cultivated grapevine may be that documented at the Bronze Age tell near the village of Yunatsite and at the archaeological sites of Yazdach, Koprivlen and Nebet Tepe.

Rubus idaeus L. and *R. fruticosus* L. – blackberry and raspberry

Blackberry is common in the zones of moderate climate in Europe, Asia and North America. It grows in humid and rocky places. The fruit ripens in late autumn. The leaf of *Rubus* species contains tannic substances used in traditional medicine. Young leaves are used in tea production. There are frequent archaeological finds of *Rubus* seeds from the Neolithic and Bronze Age sites in the Balkans, for instance from Opovo in Serbia (Borojević 2006) and Kastanas in Greece (Kroll 1979: 173–189). In Bulgaria, the remains come from the tell-settlement of Chavdar near the town of Kazanlak, the tell-settlement of Karanovo (phase Karanovo II-III) and so on.

Fragaria vesca L. – wild strawberry

Wild strawberry is a perennial herbaceous plant usually growing on hillsides, and in young woodland and sparse forest. The leaves are used as in medicine, while the fruit has a rich flavour and is eaten fresh or made into jams and preserves. Charred seeds of wild strawberry were found in samples collected from the Neolithic layers of Karanovo and Durankulak (Popova 2009: 55). They were also detected at prehistoric sites in Serbia, FYR Macedonia and Greece (e.g. Borojević 2006).

RUDERAL PLANTS AND ARABLE WEEDS WITH EDIBLE PARTS

Many different plants can be represented in charred archaeobotanical assemblages – herbaceous species, shrubs and bushes, trees – but charred remains preserve traces of only a fraction of the potentially used vegetation. Human activity is one of the basic factors affecting the character and directions of change of vegetation in various regions. As a result, some plant species may lose their habitat and even disappear; others expand into new areas, or transform into synanthropic, in search of favourable growing conditions. The latter are often found in archaeological deposits together with the remains of cultivated crops. Such species are *Chenopodium album*, *Polygonum* sp., *Rumex acetosella* L. They, however, have some properties that could, perhaps, attract humans to collect and use them.

Many other ruderal plants and arable weeds could used have also been collected – as food or fodder. For example, seeds of the following species are also common in archaeological layers from Neolithic and Chalcolithic sites: *Amarantus* sp. – amaranth; *Setaria italica*, *S. glauca*, *S. viridis* – different kinds of bristle-grass; *Vicia sativa* – common vetch; *V. angustifolia* – winter vetch; species of *Trifolium* sp. and *Vicia* sp. (which represent good forage for animals).

Chenopodium album L. – fat-hen

Thanks to its rich taste, *Chenopodium album* is used as a vegetable and spice. The seeds contain saponins but, when thermally treated, they can be added to food. Traditionally, the plant is valued mostly because of its nutritious qualities but it is also used for preparation of healing potions, such as those against bronchial infections. Fat-hen was also used for obtaining dark blue colour.

Charred seeds of this species are often found at Neolithic and Chalcolithic sites, as well as at Bronze Age sites in Bulgaria. The seeds of several species *Chenopodium* were reported for Yabalkovo, Koprivets, Kapitan Dimitriev, Yunatzite (Table 3). Most numerous are the finds from Karanovo and Durankulak, where different species of *Chenopodium* were recorded: *Chenopodium foliosum* L., *C. album* L., *C. polyspermum* L., *C. murale* L. and *C. hybridum* L.

Table 3 – Presence/absence of fat-hen (*Chenopodium album* L.)
in different periods in Bulgaria

Табела 3 – Налази остатака пепељуге (*Chenopodium album* L.)
у различитим периодима у Бугарској

Site / Локалитет	Neolithic / Неолит	Chalcolithic / Енеолит	Bronze Age / Бронзано доба	Iron Age / Гвоздено доба	Roman period / Антика
Кап. Dimitriev					
Karanovo					
Kovachevo					
Koprivetz					
Orlovetz					
Yabalkovo					
Madretz					
Yunatzite					
Galabovo					
Kamenska Chuka					
Ada Tepe					
Gledachevo					
Abritus					
Pistirus					

***Rumex acetosella* L. – sorrel and *Polygonum aviculare*
– common knotgrass**

Rumex acetosella L. is a perennial herb with edible, but not highly nutritious leaves, root and seeds. It is common on acidic, sandy soils in heaths and meadows (Stace 2010: 1–450). Common knotgrass is an annual herb, widespread in temperate regions. Seeds of knotgrass and sorrel were recorded at Kapitan Dimitriev, Karanovo and Yabalkovo (Popova 2009: 150–151, 2010: 1–107).

DISCUSSION AND CONCLUSIONS

The biology of the above-listed wild plants with edible fruit points at the period between August and October as the time when the fruits reach ripeness and could have been gathered by prehistoric communities. The wild plants producing branches, roots and leaves possibly used in the preparation

of medicines and ointments, or collected for other purposes (e.g. fodder) could have been harvested earlier, and over longer time-window, from spring till autumn (see Table 4 and Table 5). Of great interest are herbaceous plants, whose presence is documented in the samples from most of the considered sites. The remains of sorrel, knotgrass and fat-hen are widely present and, though low in calories, may have been gathered for food.

Table 4 – Season of gathering of different wild plants
Табела 4 – Сезона сакупљања различитих дивљих биљака

Plant species / Биљна врста		COLLECTION PERIOD / СЕЗОНА САКУПЉАЊА					
		May	June	July	August	September	October
ACORN / ЖИП	<i>Quercus</i> sp.						
CORNELIAN CHERRY / ДРЕЊИНА	<i>Cornus mas</i>						
PLUM or CHERRY / РИНГЛОВ	<i>Prunus</i> sp.						
WILD GRAPEVINE / ДИВЉЕ ГРОЖЂЕ	<i>Vitis vinifera</i> ssp. <i>sylvestris</i> Gmel.						
WILD CHERRY / ДИВЉА ТРЕШЊА	<i>Prunus</i> cf. <i>cerasus</i> L.						
HAZELNUT / ЛЕШНИК	<i>Corylus avellana</i> L.						
BLACKBERRY or RASPBERRY / КУПИНА или МАЛИНА	<i>Rubus</i> sp.						
WILD ROSE / ШИПУРАК	<i>Rosa canina</i> / <i>Rosa</i> sp.						
WILD STRAWBERRY / ШУМСКА ЈАГОДА	<i>Fragaria vesca</i> L.						
DWARF ELDER / АПТОВИНА	<i>Sambucus ebulus</i> L.						
ELDER / ЗОВА	<i>Sambucus nigra</i> L.						
SORREL / КИСЕЉАК	<i>Rumex acetosella</i> L.						
FAT-HEN / ПЕПЕЉУГА	<i>Chenopodium album</i> L.						
COMMON KNOTGRASS / ТРОСКОТ	<i>Polygonum aviculare</i> L.						

Table 5 – Potentially useful parts of the plants and their possible role
Табела 5 – Потенцијално корисни делови биљака и њихова могућа употреба

		POTENTIALLY USEFUL PARTS OF THE PLANTS					POSSIBLE PURPOSE	
		root / корен	bark, wood or stem / корен, стабло или стабљика	leaves / листови	flowers / цветови	fruit, seeds, kernel / плод, семе, језгро	food / храна	medicine and infusions / лековито средство
ACORN / ЖИП	<i>Quercus</i> sp.		•	•	•	•	•	•
CORNELIAN CHERRY / ДРЕЊИНА	<i>Cornus mas</i>		•			•	•	•
PLUM or CHERRY / РИНГЛОБ	<i>Prunus</i> sp.					•	•	
WILD GRAPEVINE / ДИВЉЕ ГРОЖЂЕ	<i>Vitis vinifera</i> ssp. <i>sylvestris</i> Gmell.			•		•	•	
WILD CHERRY / ДИВЉА ТРЕШЊА	<i>Prunus</i> cf. <i>cerasus</i> L.				•	•	•	•
HAZELNUT / ЛЕШНИК	<i>Corylus</i> <i>avellana</i> L.		•			•	•	•
BLACKBERRY or RASPBERRY / КУПИНА или МАЛИНА	<i>Rubus</i> sp.			-	•	•	•	•
WILD ROSE / ШИПУРАК	<i>Rosa canina</i> / <i>Rosa</i> sp.				•	•	•	•
WILD STRAWBERRY / ШУМСКА ЈАГОДА	<i>Fragaria</i> <i>vesca</i> L.			•		•	•	•
DWARF ELDER / АПТОВИНА	<i>Sambucus</i> <i>ebulus</i> L.			•	•	•	•	•
ELDER / ЗОВА	<i>Sambucus</i> <i>nigra</i> L.	•		•	•	•		•
SORREL / КИСЕЉАК	<i>Rumex</i> <i>acetosella</i> L.	•	•	•	•	•	•	•
MANYSEED GOOSEFOOT / БАШТЕНСКА ПЕПЕЉУТА	<i>Chenopodium</i> <i>polyspermum</i> L.		•	•		•	•	•
FAT-HEN / ПЕПЕЉУТА	<i>Chenopodium</i> <i>album</i> L.		•	•	•	•	•	•
COMMON KNOTGRASS	<i>Polygonum</i> <i>aviculare</i> L.			•		•	•	•

The most detailed data on wild plant remains come from the sites located in the Upper-Thracian lowlands, namely Karanovo, Yabalkovo, Kapitan Dimitriev. Thrace would indeed have offered favourable conditions for settled life, agricultural production and exploitation of wild plant resources. The region is characterized by mild, transitional-continental climate, predominating low relief and fertile alluvial soils. Such conditions are ideal for the formation of rich vegetation cover, which, it seems, the first settlers took advantage of to enrich and diversify their diet. Archaeobotanical studies of the early settlements in the Struma river valley, which is also characterised by favourable climate, show similar results. The sites of

Galabnik, Kovachevo, Eleshnitsa and so on yielded remains of Cornelian cherry fruit, acorns and, to a lesser extent, herbaceous edible plants.

A gradual diversification of the diet over time can be observed, evident from the inclusion of new fruits and nuts of local and, especially, of Mediterranean origin such as figs, grapes, pistachio. The remains of these were recovered from the Chalcolithic and Bronze Age layers of the sites of Karanovo, Durankulak, Galabovo, Tatul, Kamenska Chuka, Yunatzite.

Wild plant gathering would have been an important food provision strategy and a key component of daily life in the Neolithic and Chalcolithic. This activity would have had bearing on some complex issues such as subsistence economy, labour organisation, needs of individual households. On the basis of the here-presented results, the conclusion is that early farming communities used many of the naturally available food sources, and perhaps also managed some of them to a certain extent.

REFERENCES

- Arnaudov, N. 1949. Predistorichski rastitelni materiali. *Gogichnik na Sofijskia Universitet. Prirodo-Matematicheski fakultet* XLV, 3: 57–73. (Предисторически растителни материали. Годишник на Софийския Университет, Природо-математически факултет).
- Borojević, Ksenija. 2006. *Terra and Silva in the Panonian Plain. Opovo Agro-Gathering in the Late Neolithic*. BAR International Series 1563. Oxford: Archaeopress.
- Franke, Gunther and Karl Hammer. (eds.) 1976. *Früchte der Erde*. Leipzig, Jena, Berlin Urania-Verlag.
- Hajnalova, E. 1975. Rastitelni nahodki ot selichnata mogila pri Goljamo Delchevo. (Растителни находки от селищната могила при Голямо Делчево (Plants remains of tell settlement Goljamo Delchevo). In H.Todorova (ed.), *Razkopki i prouchvaniya* (Excavation and research) 5: 303–314.
- Kroll, Helmut. 1979. Kulturpflanzen aus Dimini. *Archaeo-Physika* 8: 173–189.
- Kroll, Helmut. 1981. Thessalische Kulturpflanzen. *Zetrscr. Archäeol.* 15: 67–103.
- Kroll, Helmut. 1983. Kastanas. Ausgrabungen in einem Siedlungshugel der Bronze – und Eisenzeit Makedoniens 1975–1979. Die Pflanzenfunde. *Praehistorische Archäologie Sudosteuropa* 2: 1–176. Verlag Volkes Spiess, Berlin.
- Lazarova, M. 1995. „Human impact on the natural vegetation in the region of lake Srebarna and mire Garvan (northeast Bulgaria) – palynological and palaeoethnobotanical evidence”. In *Advance in Holocene Palaeocology in Bulgaria*, eds. E. Bojilova and S. Tonkov, 47–67. Pensoft Publ, Sofia – Moscow.

- Marinova, Elena. 2001. Vergleichende palaeoethnobotanische Untersuchung zur Vegetationsgeschichte und zur Entwicklung der prahistorischen Landnutzung im Bulgarien. Dissertation, Bonn University.
- Marinova, Elena. 2003. Palaeoethnobotanical study of Early Bronze Age II in the Upper Stryama Valley (Dubene – Sarovka IIB). BAR International Series 1139, 2: 499–504.
- Marinova, Elena, Elena Chakalova, Dimitrina Stoyanova, Snežana Grozeva and Elena Dočeva. 2002. Ergebnisse archäobotanischer Untersuchungen aus dem Neolithikum und Chalkolithikum in Südwestbulgarien. *Archaeologica Bulgarica* 3: 1–11.
- Popova, Tzvetana. 1991. Palaeoethnobotanical study of the Yunatsite – Bronze Age Settlement – Pazardzik area, South Bulgaria. *Palaeovegetation Development in Europe. Proceeding of the Pan-European Palaeobotanical Conference*, Vienna 19–23 September: 69–72.
- Popova, Tzvetana. 1992. L'analyse des restes végétaux carbonisés du tell Dijadovo. *Symposia Thracologica* 9. *Bibliotheca Thracologica* 11: 238–241.
- Popova, Tzvetana. 1995. Palaeoethnobotanical remains from the early Bronze Age settlement of Galabovo (South Bulgaria). In *Res archaeobotanicae – Proceeding of the Ninth International Workgroup for Paleoethnobotany Symposium*, eds. Helmut Kroll and R. Pasternak, 261–266. Kiel: Oetker-Voges.
- Popova, Tzvetana. 1999. Etude Carphologique et anthracologique de tell Kajmenska cuka (Blagoevgrad) – Bronze final. In *Thracian World at the crossroads of civilization. Processing of the VII International Congress of Thracology*. Constanza – Mangalia – Tulca, II: 477–481.
- Popova, Tzvetana. 2003. Palaeoethnobotanical studies from the region the Koprivlen. In *Koprivlen I. Rescue Archaeological Investigations along the Gotse Delchev-Drama Road 1998–1999, 1*, eds. P. Delev, P. and E. Bozkova, 279–289. Road Executive Agency. Archaeological Institute, Bulgarian Academy of Sciences.
- Popova, Tzvetana. 2008. Archeobotanichni materiali ot selichnata mogila Hotniza. (Archaeobotanical materials from the tell settlement Hotniza). In *Praistoricheski prouchvania v Bulgaria. Novite predizvikatelstva*. (Prehistorical studies in Bulgaria. The new challenges). Report from National prehistorical conference: 26–29. 04. 2006. ed. Maria Gurova, 189–194. Pechtera: Archaeological Institute, Bulgarian Academy of Sciences.
- Popova, Tzvetana. 2009. A classified catalogue of the archaeobotanical remains the territory of the republic of Bulgaria 1980–2008. Paleobotanicheski katalog na mestopolojenija r proucheni rastitelni ostanke na teritorijata na Bulgaria (1980–2008). (Палеоботанически каталог на местоположения и проучени растителни останки на територията на България (1980–2008)). *Interdisciplinary Studies* XX–XXI: 71–166.
- Popova, Tzvetana. 2010. *Plant environment of man between 6000 and 2000 B.C. in Bulgaria*. BAR International Series 2064. Oxford: Archaeopress.
- Popova, Tzvetana and Elena Bojilova. 1995. Palaeoecological and palaeobotanical Data from the Bronze Age in Bulgaria. In *In the Steps of James Harvey Gaul. In me-*

- moriam* 1, eds. Mark Stefanovitch, Henrieta Todorova and Harald Hauptmann, 391–399. Sofia.
- Renfrew, M. 1979. The first farmers in South East Europe. *Archaeo-Physika* 8: 243–265.
- Schoch, H. and S. Pawlik. (eds) 1988. *Botanical macro-remains*. Bern, Stuttgart Haupt.
- Stace, Clive A. 2010. *New flora of the British Isles* (third ed.) Cambridge: Cambridge University Press.
- Tonkov, Spassimir, Elisaveta Bozilova, Elena Marinova and Høgne Junger. 2008. History of vegetation and landscape during the last 4000 years in the area of Straldza mire. *Phytologica Balcanica* 14 (2): 185–191
- Valamoti, Sultana. M. 2004. *Plants and People in the late Neolithic and Early Bronze age North Greece. An Archaeobotanical Investigation*. BAR International Series 1258. Oxford: Archaeopress.
- Valamoti, Sultana M., M. Mangafa, Haido Koukouli-Chrysanthaki and Dimitra Malamidou. 2007. Grape-pressings from northern Greece: the earliest wine in the Aegean?. *Antiquity* 81: 54–61.
- Weninger, Bernhard, Eva Alram-Stern, Eva Bauer, Lee Clare, Uwe Danzeglocke, Olaf Jöris, Claudia Kubatzki, Gary Rollefson, Henrieta Todorova and Tjeerd van Andel. 2006. Climate forcing due to the 8200 cal yr B.P. event observed at Early Neolithic sites in the east Mediterranean. *Quaternary Research* 66 (3): 401–420.
- Zohary, Daniel, Maria Hopf and Ehud Weiss. 2000. *Domestication of Plants in the Old World. The origin and spread of cultivated plants in West Asia, Europe and Nile Valley*. Oxford: Oxford Science Publication.
- Homer, *Odyssey*, b. X, 240–245

Цветана Попова, Хана Христова

**Археоботанички налази дивљих биљних врста
на неолитским и енеолитским локалитетима
у праисторији Бугарске**

Резиме

У праисторијским временима, људи су комбиновали различите начине набављања хране како би осигурали уравнотежену исхрану. У то су спадале како гајене, тако и дивље биљне врсте. Подаци о скупљању дивљих јестивих биљних врста у праисторији на тлу Бугарске потичу од се-

мена дивљих биљака и плодова пронађених у археоботаничким узорцима. Већина документованих дивљих биљних врста са јестивим плодом биле су прикупљане у периоду од августа до октобра, што је време када ови плодови сазревају. Биљне врсте код којих су коришћени корење и лишће, потребљаванвероватно уе за припрему лековитих припрему лековитих препарата и мелема, или биљке прикупљене у друге намене (на пример, за сточну храну) могле су се сабирати и раније, током дужег временског периода, од пролећа до јесени.

Најдетаљнији подаци о остацима дивљих биљака долазе са локалитета у низинама Горње Тракије, тачније са локалитета Караново, Јабалково, Капитан Димитриево. Тамо су заиста били повољни услови за стално насељавање, земљорадњу и експлоатацију дивљих биљних ресурса. Регион карактерише блага, прелазно-континентална клима, преовлађује низак рељеф и плодно алувијално тле. Овакви услови су били идеални за формирање богатог вегетативног покривача, који су, како изгледа, први насељеници искористили да би обогатили своју прехрану и учинили је разноврсном. Археоботаничке студије на раним насељима у долини реке Струме, коју такође карактерише повољна клима, показују сличне резултате. Локалитети Галабник, Ковачево, Елешница, и други, такође су пружиле остатке дрена, жира, и, у мањој мери, зељастих јестивих биљака.

Може се уочити постепена диверсификација исхране током времена, која се огледа у увођењу нових воћних и орашастих плодова локалног и нарочито медитеранског порекла, као што су смокве, грожђе, пистаћи. Њихови остаци су откривени у неолитским и бронзанодопским слојевима локалитета Караново, Дуранкулак, Галабово, Татул, Каменска Чука, Јунаците.

Прикупљање дивљих биљних врста представљало је значајну стратегију у прибављању хране и кључну компоненту дневног живота у неолитском и енеолитском периоду. Ова активност је била повезана са економијом прехране, организацијом рада, потребама појединачних домаћинстава. На основу овде представљених резултата, јасно је да су ране земљорадничке заеднице користиле многе од природно доступних извора хране, и могуће чак и до извесне мере управљале њима.