Agricultural practices in ancient Macedonia from the Neolithic to the Roman period

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I hereby declare that the work submitted is mine and that where I have made use of another’s work, I have attributed the source(s) according to the Regulations set in the Student’s Handbook.

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Abstract

This dissertation was written as part of the MA in Black Sea and Eastern Mediterranean Studies at the International Hellenic University.

The aim of this dissertation is to collect as much information as possible on agricultural practices in Macedonia from prehistory to Roman times and examine them within their social and cultural context. Chapter 1 will offer a general introduction to the aims and methodology of this thesis. This chapter will also provide information on the geography, climate and natural resources of ancient Macedonia from prehistoric times. We will then continue with a concise social and cultural history of Macedonia from prehistory to the Roman conquest. This is important in order to achieve a good understanding of all these social and cultural processes that are directly or indirectly related with the exploitation of land and agriculture in Macedonia through time. In chapter 2, we are going to look briefly into the origins of agriculture in Macedonia and then explore the most important types of agricultural products (i.e. cereals, legumes, fruit, olive, grapes), which are directly related with the evidence in chapter 3. The next chapter, which is the main chapter of this dissertation, will explore the main archaeological evidence of agricultural production in Macedonia from the Neolithic to the Roman period followed by a critical synthesis and discussion of the finds. The evidence in chapter 3 is presented chronologically rather than thematically for reasons of clarity. In the closing chapter 4, we offer a brief synopsis of the main themes explored in the dissertation while also providing some thoughts for the incorporation of knowledge deriving from ancient agricultural practices in Macedonia, to modern agricultural practices.

At this point, I would like to express my deep appreciation and extend my obligations to my professors, Dr Manolis Manoledakis and Dr Georgia Aristodimou, whose help and guidance has been invaluable for the completion of this dissertation.

Keywords: ancient Macedonia, agricultural practices, archaeology, archaeobotany.

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CHAPTER 1

Introduction

1.1. Prologue

In recent years, seeds and plant remains from archaeological sites are being carefully collected and studied within their contemporary social and cultural context. Seeds can provide information not only about the type of plants, fruit and cereals consumed by people in antiquity, but they also give valuable insight into agricultural practices. Unlike written sources which can sometimes be fragmentary and pottery or other archaeological remains, which are often out of context, seeds are important archaeological evidence that provides information on cultivation practices. Archaeobotany is the study of ancient seeds and through the careful examination of plant remains it can provide valuable information on the eating habits of people based on arable but also wild edible plants as well as the availability of wild fruits as an additional source of energy. Moreover, the study of ancient plants provides information on the possible pharmaceutical use of certain plants and how they have evolved to modern time. Moreover, ancient seeds can give us information on unique cultivation techniques, and offer an insight on the exploitation of domesticated animals for agricultural purposes. At the same time, archaeobotany is also interested in the exploration of various environmental patterns and the climate during different periods of the past.

Information on past agricultural practices also derive from archaeological artefacts which are directly related to plant exploitation – these include vessels, tools and millstones. However, this type of evidence is not always available or it is often found out of context. In modern excavations, the collection of plant remains is achieved through flotation, a safe and
precise method for gathering as much information as possible on past plant remains. By analysing the plant remains and taking into consideration all the other archaeological facts, archaeologists are able to understand which species were selected and cultivated in order to be produced massively, the methods of cultivation used, the storage methods as well as the road to consumption.

The amount of archaeobotanical material available for study in Macedonia has increased steadily over the past few decades as a result of controlled excavations and careful collection techniques, yet not all excavations are published consistently and there are still knowledge gaps that need to be filled. On the one hand, synthetic works on Greek agricultural practices are less frequent than one would expect, while at the same time thorough exploitation of the available material must be accompanied by recognition of its limitations and specificities. The aim of this dissertation is to collect as much information as possible on agricultural practices in Macedonia from prehistory to Roman times and examine them within their social and cultural context. Examined through a critical lens, these particular aspects of archaeological interpretation can complement each other and offer new insights into the understanding of the material remains of agriculture in Macedonia diachronically.

1.2. The importance of archaeobotanical remains

Ancient seeds and parts of the plants are easy to preserve if the conditions permit it. For instance, charred seeds and seeds in a state of high humidity are usually preserved in excavations and so do seeds and other plant parts that survive in humid places. Sometimes seeds and plant parts are also preserved as fingerprints in the clay of various vessels or they are petrified, meaning that the plant tissue is replaced by inorganic compounds, such as calcium carbonate. Finally, seeds can also survive when they are in close proximity to metals
such as copper. All these states of preservation allow archaeologists to study seeds in detail and draw useful conclusions in terms of their identification and agricultural or other use.

The most common condition of conservation of archaeobotanical remains in Greece is charring.\(^1\) When seeds or plant remains come in contact with fire, either the result of food consumption or the effect of destruction, they are charred and they can be preserved for centuries. Archaeologists reveal archaeobotanical remains through a time-consuming and painstaking activity known as flushing and flotation. Ground obtained from the archaeological layers is placed in a specially shaped barrel, inside of which there is a system of pipes that supplies water to a certain pressure. With the continuous flow of water and the agitation of the soil, the charred parts of the plants start to float as a result of overflowing, they end up in the special geological sieves that are located in the outflow of the shaped barrel inlet.\(^2\) Following the collection of the seeds and the other plant remains from the archaeological site, archaeobotanical remains are studied carefully under the microscope where different species are identified with the aid of data banks. Recognition is granted on the basis of specific morphological characteristics and marks the beginning of the comparison of ancient seeds with modern material, a ‘reference collections’ which should be a fundamental part of every archaeobotanical laboratory.\(^3\)

The remains of cultivation, harvesting and food consumption, are very important archaeological finds and provide information because they reveal a lot of information on ancient agricultural practices including the selection of the species to be cultivated, processing the harvest to become edible as well as the various cultivation methods. Information on agricultural practices also come from other archaeological finds such as tools,

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2 French 1971.
3 Megaloudi 2006.
millstones storage houses as well as vases used to process, transport, store and consume the food. By attempting to analyse the archaeological and botanological data, we are given a good glimpse into the economy, but also the organisation of a society in a wider context. Flotation is gradually becoming a common practice in many excavations in Greece and this had led to the gathering of important information on agriculture in the wider area of Macedonia from prehistory to the Roman conquest. Archaeobotanical remains help us understand which species were selected and cultivated as well as the agricultural methods of cultivation and storage were used. Under this context, we can understand better current agricultural practices.

1.3. Concise literature review

In recent years, excavations in Macedonia have revealed important information on the agricultural practices on various Neolithic communities. Important archaeobotanical information derives from the following sites: Nea Nikomedia, Thermi, Stavroupoli, Dispilio, Dikili Tash and Makriyalos. Evidence from these archaeological sites, attests to the cultivation of many kinds of wheat: monocot (Triticum monococcum), dicot (Triticum dicoccum), soft (Triticum aestivum) and durum wheat (Triticum durum), which is also cultivated to this day. They also barley (Hordeum vulgare) and some legumes as well, most of which are known to us from our daily diet, lentils (Lens culinaris), peas (Pisum sativa), beans (Vicia faba) and millet to a lesser extent (Panicum miliaceum). Diet of the Neolithic populations is enriched with local fruit and fruit transported from remote areas: we have evidence that they were consuming blackberries (Rubus fruticosus), grapes (Vitis), figs (Ficus carica), hazelnuts (Coryllus avellana)

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4 For a more detailed discussion and references of all the sites mentioned in this section see Chapter 3.
and wild pears (*Pyrus amygdaliformis*) among others. Dikili Tash has produced a large number of grape pits from a single context, which are probably indicative of wine-making. Besides domesticated species, archaeologists have also revealed wild species in the Neolithic sites, mostly weeds that attach to various crops and have to be removed from the products intended for foods (but could be used for other purposes (i.e. feeding the animals etc).

Bronze Age sites with archaeobotanical evidence include Mesimeriani Toumba, Archontiko, Megali Toumba and Assiros. During this period, people continue to grow the same species found in the previous periods; however, wheat production is intensified and people start to experiment with wine-making as well. At Megali Toumba in Thessaloniki, there is evidence for mass wine-making as derived from charred peels, stems and bare grape seeds. The transition from late Bronze Age to the Geometric period, can be seen through limited remains from Mesimeriani Toumba and plant remains from the site of Krania, which are unfortunately unpublished. At Mesimeriani Toumba charred grains are limited while in Krania, they are found in very large quantities. The types of cereals and grains discovered in both sites are not different from the species which are prevalent in the Neolithic and Bronze Age.

From the Classical period onwards, apart from archaeological data, information for agriculture and various crops are provided in the description of ancient authors (such as Theophrastus, and Romans such as Cato and Pliny). Archaeobotanical data in this period derive from the centre of Thessaloniki, and more specifically the Governor’s Square, where archaeologists found charred grains of wheat, barley, oats (*Avena sativa*), rye (*Secale cereale*) and legumes. Impressively, thousands of sesame seeds (*Sesamum indicum*) and pine nuts

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5 See chapter 2 for more information
(Pinus pinea), where also discovered in the same excavation. In Ossa, vineyard was cultivated and so was in the farmhouses of Hellenistic Pieria were oil and wine was also produced at a larger scale, as indicated by the remains of charred olive stones and grape seeds.

1.4. Methodology and limitations of research

This research project draws on archaeological evidence already published in archaeological reports and secondary literature. The geographical scope of this project is largely determined by the nature of the evidence; however, we will also look into material from earlier or later periods for a comparative analysis. At this point, it would be useful to state that Macedonia is used as a designation of the geographical space that corresponds to modern Macedonia and included many sites of Ancient Macedonia. Long before the unification of the tribes and the creation of the Macedonian kingdom around the 5th c. BC, these lands comprised of distinct geographical entities with specific cultural characteristics. For this reason, we are going to use the name Macedonia from a geographical rather than historical viewpoint (i.e. it is not possible to speak of Macedonia in Neolithic times).6

For this dissertation, we are going to use different types of evidence with an emphasis on the archaeological remains of agricultural activities. These will be archaeobotanical remains, material remains of agricultural activity (i.e. pottery) as well as written sources and ethnography to a lesser extent. However, not all of this type of evidence can be analysed equally due to insufficient publication and lack of continuous excavations. Similarly, the lack of synthetic studies (i.e. zooarchaeology) for some sites prevents us from drawing conclusions that would enlighten additional aspects of agriculture and animal husbandry in Macedonia.

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6 However, you will also notice that when referring to prehistoric times, sometimes Macedonia is swapped for northern Greece, which admittedly is a more general term.
from the prehistoric period to Roman times. Overall, the amount of the information provided is sufficient for a comprehensive study of the area within the proposed chronological framework, but a quantitative approach is not possible due to the uneven relationship between published and unpublished material.

Chapter 1 will offer a general introduction to the aims and methodology of this thesis. This chapter will also provide information on the geography, climate and natural resources of ancient Macedonia from prehistoric times. We will then continue with a concise social and cultural history of Macedonia from prehistory to the Roman conquest. This is important in order to achieve a good understanding of all these social and cultural processes that are directly or indirectly related to the exploitation of land and agriculture in Macedonia through time. In chapter 2, we are going to look briefly into the origins of agriculture in Macedonia and then explore the most important types of agricultural products (i.e. cereals, legumes, fruit, olive, grapes), which are directly related with the evidence in chapter 3. The next chapter, which is the main chapter of this dissertation, will explore the main archaeological evidence of agricultural production in Macedonia from the Neolithic to the Roman period followed by a critical synthesis and discussion of the finds. The evidence in chapter 3 is presented chronologically rather than thematically for reasons of clarity. In the closing chapter 4, we offer a brief synopsis of the main themes explored in the dissertation while also providing some thoughts for the incorporation of knowledge deriving from ancient agricultural practices in Macedonia, to modern agricultural practices. By looking into various aspects of agricultural production in Macedonia from prehistory to Roman times, we expect to bring forward a comprehensive picture of this important subject and encourage the production of more similar studies in the future.
1.5. Geography, climate and natural resources in Macedonia

What is known as Macedonia is a geographic region in northern Greece and the southern Balkans. Today, the biggest part of ‘historical’ Macedonia is within the borders of the modern Greek State (fig. 1). Macedonia is the second largest inhabited area of Greece and a major cultural and economic melt pot. Throughout antiquity, the country was inhabited by the Macedonians, who not only gave their name to the region, but also created a unified kingdom by bringing together regions that were not proximate geographically in the 7th c. BC. Until the sack of the kingdom by the Romans in 167 BC, ancient Macedonia, in a geographical sense, designated all the lands between the Pindus chain to the west and the plain of Philippi to the east, and between Mount Olympus to the south and a line close to the border of present-day Greece to the north (fig. 2). The centre of the kingdom was the area in the plain of Emathia, formed by the rivers Haliakmon, Loudias, and Axios, and the smaller plain of Pieria, with its surrounding mountains of Olympus, the Pierian mountains, Bermion, and Barnous.

To the west, Upper Macedonia consisted of higher plateaux. From the south to the north, were Elimeia, Orestis, Lynkos and, even further west, were Tymphaia and Parauaia, which were small independent kingdoms incorporated by the Macedonians. For as many as two centuries, the Axios River formed the eastern border of the kingdom of the Macedonians (fig. 2). The conquest and incorporation into Macedonia of the new territories to the east of this river, which were shared between colonies from the Greek city-states along the coasts and the tribes of the interior, including the Crestonians, Mygdonians, Bottiaeans, Odomantes,

7 Hatzopoulos 2012, 1.
8 Hammond 1989, 2.
Bisaltes, and Edonians, was a long process that started at the beginning of the 5th c. BC and was barely completed by the Roman conquest.

Communication and diffusion of the population were granted by two major routes, both of which became Roman roads at a later period.\(^9\) The first road linked the Axios valley with the Thermaic Gulf and southern Greece, whereas the second, the infamous ‘Egnatia Odos’, allowed travellers to pass through the Balkan peninsula from west to east.\(^10\) Both these roads were royal, meaning they were controlled, laid and measured in stades by the official Macedonian administration.\(^11\)

The alluvial plain of western Macedonia is a recent formation, and has replaced the earlier lake of Giannitsa and the associated swampland around it. More importantly, studies have shown that the Neolithic landscape was quite different from the present one around the area of Mandalo. Paleoclimatic studies suggest that the coastline in prehistory was more inland than today and the Thermaic Gulf extended into the area of the modern alluvial plain.\(^12\)

The reconstruction of the early Neolithic landscape is possible due to pollen samples from Giannitsa and sea shells from Nea Nikomedeia. The vicinity of the sea of the Neolithic settlement of Giannitsa B, is indicated by the very rich finds of seashells.\(^13\) For Makriyalos, on the other hand, it is quite likely that the prehistoric landscape was much different from today as well: the site of Kato Ai-Giannis (near Makriyalos) extends under 8 m of deposits windswept from the mountains and placed along the coastline of Pieria.\(^14\)

\(^{9}\) Ginouves 1993, 19.  
\(^{10}\) Ginouves 1993, 19.  
\(^{11}\) Ginouves 1993, 19.  
\(^{12}\) Valamoti 2004, 5.  
\(^{13}\) (Chrysostomou and Chrysostomou 1993.  
\(^{14}\) Valamoti 2004, 5.
In terms of climatic conditions, Macedonia, which is geographically located in the Balkan peninsula, ‘falls within two very distinctive and contrasting’ zones – that of the Mediterranean which consists of hot, dry, rainless summers and rainy winters and that of central Europe with rainfall throughout the year and low temperatures throughout the winter.\textsuperscript{15} The climate in Macedonia is generally cooler compared to the climate of Southern Greece. During the winter, cold air comes from the Balkans accompanied by high rainfall and some snow. However, the summers are moderately hot and dry without much rainfall. Along the coast of the Thermaic Gulf, olives are cultivated and this is indicative of the Mediterranean influence. More importantly, the presence of water near Thessaloniki, Katerini, some parts of Serres and the coastal areas of Thrace is also indicative of milder winters in these areas. In most of the interior of Macedonia, however, the climate is colder during the winters and warmer during the summers, with occasional thunderstorms along the plains. Unfortunately, hard evidence for the climatic conditions from the Neolithic period onwards are lacking, though no major climatic changes have been observed by environmental research. However, one should expect a certain variation from region to region in the past.\textsuperscript{16}

For the Greeks in the South, Macedonia was an ‘exotic’ land with distinct natural resources. Nowadays, Macedonia is one of the most fertile regions of Greece and there is every reason to believe that this picture is probably not very different from that in antiquity. Macedonia is a region consisting of high mountains, perennial rivers, streams and extensive plains. Herodotus (8.118) describes the coastal plain around Naoussa as the gardens of Midas, where beautiful roses grew. When Herodotus visited Macedonia (around 450 BC), the rivers Loudias and Haliakmon were joined and almost a hundred years later and until the late 1980s,

\textsuperscript{15} Valamoti 2004, 6.
\textsuperscript{16} Valamoti 2004, 7.
both rivers poured into the Axios. Given these conditions, pastoralism and the raising of sheep were very crucial for the Macedonians already from antiquity as those were the main sources of food along with agriculture.

Herodotus narrates a story (8.137-9), where three young brothers who came to seek refuge to the king, were employed to tend the horses, the cattle, the sheep and the goats. Eventually, one of them, Perdiccas, when asked to be paid a fair amount for his labour, was refused. He drew a line around a patch of sunlight on the floor and collected it three times with the folds of his clothing before departing along with this brother. After a few years, he returned to reclaim the sunlight and establish himself as the rightful heir of the Macedonians. Thus, he founded the Temenids, the dynasty of Philip II and Alexander the Great. Besides being an interesting allegory of kingship, this story reveals a lot about the establishment of Macedonia around Pieria and Mount Olympus, where the story supposedly took place. Pieria (‘the rich land’) was renowned for its pastures, timber and fertile lowlands, which were cultivated up to the Thermaic Gulf. This area, along with the rest of the lands that were settled by various tribes prior to the formation of the Macedonian kingdom in the archaic period, were self-contained and self-sufficient. People depended on the land to cover their dietary needs – the lowlands produced cereals, vegetables, oil and wine, whereas the pastures on the mountains and the plains were ideal for pastoralism.

1.6. From the Neolithic to the Bronze Age

Macedonia was not only important geographically and historically from the 7th c. BC onwards. The earliest human presence in Greek territory, the Petralona hominid, has been
identified in the area of Chalkidiki. The infamous skeletal remains have been examined extensively by anthropologists and archaeologists and they are believed to belong to a distinct species of Eurafrikan Middle Pleistocene archaic Homo sapiens, known as Homo Heidelbergensis, whilst the most recent dating has established his presence to around 150–250,000 before present.\textsuperscript{20} Surface finds dated to the lower Palaeolithic suggest that Macedonia\textsuperscript{21} was inhabited in the Lower Palaeolithic as well - recent finds at Zagliveri near Thessaloniki demonstrate that human presence was more systematic during this period than had previously been thought.\textsuperscript{22} However, the data are very patchy and limited and we cannot reconstruct a habitation pattern. Moving to the Neolithic period, the first settlements in Macedonia were established in the 7th millennium and they are much later than those in Thessaly.\textsuperscript{23} Towards the end of the 7th millennium, Macedonia was inhabited by farmers and pastoralists. The site that reveals much information about the early Neolithic is Nea Nikomedia in western Macedonia, very close to the modern town of Veroia. The settlement included square houses built with wooden posts and clay. A large structure was positioned in the middle of the settlement and the excavator believes that it was a ‘community house’ or ‘shrine’, indicating the presence of communal activities.\textsuperscript{24} Other excavations in Macedonia dating to the Neolithic period have revealed that cultivated land, essentially the field, is essential to the settlement, which is the main space for economic production.\textsuperscript{25} Under this

\textsuperscript{20} Grün 1996; Poulianos (1981), the anthropologist who discovered the skeletal remains, has proposed an age of 700,000 and coined the term Archanthropus europaeus petraloniensis. Nonetheless, his dating has now been discredited.

\textsuperscript{21} Though there is no evidence that the area was called Macedonia in prehistory or even throughout the period leading to the 7th c. BC before the formation of the Macedonian kingdom, we shall use the term in a geographical sense throughout the dissertation for reasons of convenience.

\textsuperscript{22} Fotiadis 2001.

\textsuperscript{23} Kotsakis 2007, 6.

\textsuperscript{24} Van Zeist & Bottema 1971.

\textsuperscript{25} Kotsakis 2007, 6.
context, Neolithic farmers and agro-pastoralists shaped the new, landscapes, which were gradually to predominate in the area of Macedonia.

Neolithic settlements were either ‘toumbes’ or flat-extended sites. The first refers to a geological phenomenon on the landscape that is created with the gathering of building material over time and creation of a mound. Unlike the buildings of the toumbes, buildings at flat-extended sites were not founded on the same spot, but were scattered in the landscape. For instance, the late Neolithic pastoral settlement of Makriyalos at Pieria was demarcated by a pair of deep and large curved ditches. The settlement of Makriyalos is particularly important for another reason as well. Archaeologists have excavated a large, shallow pit in the centre of settlement containing the remains of hundreds of animals (mostly goats and sheep) confirming an event of mass meat consumption that is unprecedented in Neolithic. The consumption of this amount of meat has been identified as a ritual action, the specific events of which elude us. What is almost certain is that not only all the inhabitants of Makriyalos were part of it, but this event could have involved the inhabitants of the settlements in the wider region. The presence of cattle remains at Makriyalos also confirms that agricultural pastoralism was the main occupation of the inhabitants of these Neolithic settlements.

Moving to the Bronze Age, it is not clear when it was exactly established in Macedonia. Conventionally, the Bronze Age refers to the period from 3500 to 1100 BC unlike the rest of Greece, where there first ‘palace cultures’ appeared in Crete, the Cyclades and the Peloponnese. ‘Palace cultures’ though, were not introduced in Macedonia. Instead, it seems

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26 Kotsakis 2007, 7. These are easily confused with the Macedonian ‘tymvoi’, the burial monuments of the Classical and Hellenistic periods.
27 Mainland and Halstead 2002.
28 Kotsakis 2007, 7; Mainland and Halstead 2002, 111.
29 Renfrew 1972.
that the populations of the Bronze Age organised their settlements in the same sites established by the Neolithic populations. At the same time, many abandoned settlements of the Neolithic were not habitated again, and the beginning of the Bronze Age presents a general decline in the number of settlements. In the region of Langadas, for instance, the number of sites declines dramatically in the Early Bronze Age, but rises again by the end of the 3rd millennium. By the end of the Bronze Age, however, we observe an increase in the sites and settlements, and during the Iron Age the density of sites is so high that such a number has never been experienced in Macedonia since, even during the Ottoman period.\footnote{Kotsakis 2007, 8; Renfrew 1986.}

The most important characteristic of the Early Bronze Age in Macedonia is the dominance of settlements under a toumba. People left the plains and even the largest sites were now limited under smaller toumbes. Such an example in Mesimeriani Toumba in the heart of Thessaloniki.\footnote{Ridley et al 2000.} Kotsakis also observes that ‘the Macedonian landscape acquires many of the prehistoric features familiar to us today during the Bronze Age’ – \footnote{Kotsakis 2007, 8.} referring to the predominance of settlements with the toumba form.

What is really interesting though during this period, is that the sense of community so widely manifested in the Neolithic period, now seems to be abandoned in favour of the family and the individuality created within the ‘oikos’ and the ‘household’.\footnote{Kotsakis 2007, 8.} Under this context, especially during the middle and the later phases of the Bronze Age, households were autonomous and played a dominant position in the landscape. At the same time, agricultural storage spaces and large buildings for the preparation and consumption of food (i.e. heaths, silos etc) are really common in this period, demonstrating an attempt for economic autonomy.
of the ‘oikos’ within the settlement.\textsuperscript{34} Organised storage areas occupied a large part of the settlement at Assiros in the Langadas basin in the 14th and 13th centuries, as well as Toumba Thessalonikis. In both places, large quantities of cereal were stored.\textsuperscript{35}

In the Mycenaean period, the potter’s wheel was introduced and the pottery remains suggest (both imitations and imports) that Southern Greece played a big part in the exchange of goods.\textsuperscript{36} It has been advocated that Mycenaean pottery played a central role terms of food consumption in the Macedonian toumbes in the Late Bronze Age.\textsuperscript{37} However, in this instance, food consumption was not an event of extensive public interest.

The Bronze Age in Macedonia started when movements of populations and tribes occurred. However, these phenomena are difficult if not impossible to identify archaeologically. On the contrary, archaeological finds suggest that the communities which were formed in the Bronze Age continued to exist in the next few centuries as well, up to the unification of the Macedonian tribes in the 7th c. BC. The arrangement of the settlements, as well as their location in the landscape, remained almost identical, and the houses (i.e. see Megali Toumba at Thessaloniki) continued to be inhabited.\textsuperscript{38}

\textbf{1.7. From the Iron Age to the Roman period}

The transition to the Iron Age in Macedonia is quite problematic due to the scarcity of archaeological remains. According to tradition, the Macedonian kingdom was united under one power when a Temenid king, Perdiccas (or Caranus), united the tribes living around Edessa. This event – whether real or fictional – marked the transition from transhumant

\textsuperscript{34} Kotsakis 2007, 11.
\textsuperscript{35} Van Andel and Runnels 1995.
\textsuperscript{36} Kotsakis 2007, 14-5.
\textsuperscript{37} Grammenos and Kotsos 2002.
\textsuperscript{38} Kotsakis 2007; 15; Grammenos and Kotsos 2004.
shepherds into settled farmers. Aeschylus is the first to treat the unification of Macedonia in one of his fragmentary plays, ‘Iketides’. There, the poet introduces Pelasgus, king of Argos, who brags that his kinship rules ‘as far as the pure waters of the river Strymon’.\textsuperscript{39}

Herodotus, on the other hand, is not limited to one version of the legend, but repeats parts of the story throughout his work, in order to interpret historical facts or maintain the solidity of his own account.\textsuperscript{40} The same legend is preserved in later authors. According to Theopompus,\textsuperscript{41} who was said to have visited Philip’s court and was well received,\textsuperscript{42} Aigai was the name chosen for the newly-founded kingdom and it was also the place where a burial ground for the dynasty was established. Excavations over the last few decades at Vergina (identified with ancient Aigai), have revealed hundreds of funerary tumuli, the earliest of which dates to 900 BC.\textsuperscript{43} It is likely that these burials are associated with the Temenids.

The beginning of the history of Macedonia consists of many stories and myths surrounding the first kings. In the archaic period, the Macedonian kingdom was surrounded by the Illyrians, the Paionians and the Thracians on the north and the east, and the Eperotes, Thessalians and other city-states on the south and the west. Contact of these people with the Macedonians was established through the colony of Methone in Pieria,\textsuperscript{44} which was created near the river Haliakmon in the 7th c. BC by the Eretrians. Methone eventually developed into an important centre and along with the rest of the colonies,\textsuperscript{45} which were populated by a mixture of locals and colonists, played a significant role in the distribution of trade goods,

\textsuperscript{39} Aeschylus, Suppl. 250 ff.
\textsuperscript{40} Herodotus, 5.22, 8.137.
\textsuperscript{41} Theopompus in F.H.G. fr. 30, 1, 283.
\textsuperscript{42} Rhodes 2010, 27.
\textsuperscript{43} Kottaridi 2001, 359-61.
\textsuperscript{44} Bessios et al 2012, 12ff.
\textsuperscript{45} Other important colonies established in Macedonia in the same period include Dikaia near river Anthemountas (Eretria), Potidaia (Corinth) and Pallini (Eretria) in the gulf of Pallini as well as Toroni (Chalkis). Most of these citadels were built alongside important Bronze Age sites (Soueref 2011, 13).
metals and other commodities. The exchange of goods and services between the colonies and the city-states led to the establishment of solid relationships between the north and the south, under the influence of the three big forces of the period between the 7th and the 5th c. BC: Athens, Ionia and Persia. The Persian expansion, in particular, altered the balance among the traditional players and put Macedonia into the field of power politics.

Eventually, the Temenids and the Argeads used their foundation myths towards their own ends. As such, the Macedonian dynasty owed its glorious past to Hercules, Zeus, Caranus and Perdiccas. Needless, to say that these foundation myths and the divine origin of the Macedonians were exploited by later kings as well, including Philip II and Alexander the Great to a certain extent. With Aigai as the political, administrative and ceremonial capital of the kingdom of Macedonia, the kings of Macedonian started looking towards the east already from the 7th c. BC. More specifically, the Macedonians were interested to expand their territory in the Thermaic Gulf as well as take advantage of the gold mines and agricultural lands in the area. At the same time, they were also interested in expanding their influence over the Aegean.

Herodotus narrates how the Persians sent an ambassador to the Macedonian court in 510 BC, in order to request submission by king Amyntas I. However, his son, Alexander I, had them put to death. Shortly after he was the first Macedonian king to participate in the Olympic Games, establishing his Greek origin before the Hellanodikai. In 492 BC, Darius sent his general in Europe to prepare for the campaign against those Greeks who had participated in Ionian revolt and Alexander pretended to succumb. Nonetheless, the Persian attack, which

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46 Bessios et al 2012, 14.
48 Soueref 2011, 14.
49 Ginouves 1993, 28.
50 Herodotus 2. 19.
was a naval one and took place in Marathon in 490 BC, never went through Macedonia.\textsuperscript{51} It is possible that the attitude that Alexander adopted against the Persians enabled him to expand his kingdom towards the Axios and impose his power on the small kingdoms of Upper Macedonia. At the same time, he continued to export timber to Athens, which was eventually used to create the ships that defeated the Persians at Salamis. For these services to the Persian Wars, he was honoured by the Athenians as a ‘proxenos’ (ambassador) and ‘euergetes’ (benefactor).\textsuperscript{52}

In 480 BC, the Persians invaded Macedonia, ‘drinking dry its rivers’ as they marched according to Herodotus.\textsuperscript{53} The Macedonians were unprepared for this invasion, which would also have an impact on the agricultural production given that water was a prerequisite for fertile land, and submitted to Xerxes. Throughout the war, however, Alexander I, reserved his secret diplomacy with the Greek states. More specifically, he warned the Greeks that their positions at Tempe were vulnerable, protected Boeotia from Persian exaction and helped Athens to put pressure on Sparta and make them send troops to mainland Greece. From Herodotus, we also learn that on the eve of the battle at Plataea, he rode alone to the Greek camp to disclose information on the Persian plans.\textsuperscript{54} What is certain though, is that after the victory of the Greeks against the Persians, Alexander I managed to establish Macedonia on an equal scale compared to the rest of the city-states. This is attested by his participation to the Olympic Games, his dedications at the Pan-Hellenic sanctuaries at Olympia and Delphi,\textsuperscript{55} and by opening the Macedonian court to brilliant Greek minds such as the poets Pindar and

\textsuperscript{51} Ginouves 1993, 26.  
\textsuperscript{52} Ginouves 1993, 28.  
\textsuperscript{53} Herodotus Hist. 7.  
\textsuperscript{54} Herodotus, 7. 125.  
\textsuperscript{55} Herodotus, 9.81.1.
Bacchylides, and the historians Herodotus and Hellanikus.\textsuperscript{56} More importantly, the defeat of the Persians enabled Alexander to annex eastern provinces such as Mygdonia, Anthemous and Bisaltia and expand his kingdom towards the Strymon. These annexations did not have a strictly political character. New people and new lands were incorporated in the kingdom and agricultural activity was potentially intensified and diversified. Eventually, Athenian ambitions halted his expansionist desires. Overall, Alexander I achieved almost doubling the area of his kingdom, attracted populations from southern Greece and produced gold coinage of good quality, boosting the economy. His fine octadrachms, perhaps depicting the king himself hunting on horseback and followed by his dog are indicative of his success and dominance in the kingdom of Macedonia.\textsuperscript{57}

The death of Alexander I around 442 BC triggered conflict among his sons and heirs to the throne and as a result, the kingdom became unstable. It was many years late (presumably around 435 BC) that his son, Perdiccas II, acceded to the throne. However, his reign was bound to be problematic already from the beginning.\textsuperscript{58} The kings and tribe leaders of Upper Macedonia took advantage of this instability in order to consolidate their position in their respective areas and get away from the dominance of the Temenids. At the same time, the Athenians had imperialistic tendencies and their empire was extended up to the northern part of the Aegean Sea, almost around the borders of Macedonia.\textsuperscript{59} The apple of discord was Amphipolis, a rich and prosperous colony founded near Strymon around 437 BC.\textsuperscript{60} Eventually, the cities of the peninsula of Chalcidice turned against Athens and, allegedly, this was one of the causes of the Peloponnesian War.\textsuperscript{61} As his predecessor, Perdiccas

\textsuperscript{56} Various passages in Herodotus (5.19–22; 7.173–5; 8.136–44) and his emphasis on his acquaintance and relationship with Alexander I, suggest that he visited the Macedonian court as a guest of the king at some point in his lifetime.\textsuperscript{57} Ginouves 1993, 27-8, fig. 18.\textsuperscript{58} Ginouves 1993, 35.\textsuperscript{59} Hatzopoulos 2012, 2.\textsuperscript{60} Koukouli-Chrysanthaki 2002.\textsuperscript{61} Ginouves 1993, 38.
was very diplomatic in this war and by maintaining a neutral stance towards Athens and Sparta alike, he managed to preserve the independence and integrity of Macedonia. He was succeeded by his son Archelaos, whose reforming works gained him much sympathy. During his reign, he constructed many fortresses and military routes in Macedonia, while he also improved the equipment and organisation of his army. Just like Alexander I, he endowed his kingdom with high-quality coinage and was fond of the arts and literature. The painter Zeuxis, the tragic poet Euripides and the historian Thucydides were among the personalities that were invited to his court.

Archelaos’ death in 399 BC stirred a lot of dynastic trouble and in the next five years, the kingdom of Macedonia was ruled by four kings and regents: Aeropos, Amyntas II, Pausanias, and Amyntas III. The latter resumed the throne around 394 BC and had to consolidate his position in the Macedonian throne against his pretenders as well as find a solution for the rebellious claims of his allies in the Chalcidian League. At the same time, a group of separatists in Upper Macedonia claimed Pella as the new capital of the Macedonian kingdom. Amyntas III managed to restore his power and dominance over the Upper Macedonia and the Chalcidian League in 382 BC with the help of Sparta. He died of old age in 370 BC and was succeeded by his son, Alexander II. However, his brother-in-law, Ptolemy of Aloros, plotted against him and had him assassinated with the support of the Thebans. Eventually, Ptolemy resumed power and was the regent of Alexander’s brother, Perdiccas III, who was still underage. Moving away from the political agenda of his uncle, Perdiccas formed a close ally with Athens and Amphipolis at the same time. War ensued between these powers and a subsequent invasion by the Illyrians in 360 BC ended the reign of the young king and

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62 For an overview of the coinage of the period see Ginouves 1993, 37-8.
63 Hornblower 1996, 79.
64 Diodorus 37.84.
65 Roisman 2010, 160.
66 Roisman 2010, 162.
67 Roisman 2010, 162.
claimed the life of at least 4,000 Macedonians. The country was left to the mercy of the invaders.\(^6^8\)

Perdiccas left two heirs behind – Amyntas, his young son, and Philip, his younger brother. At just 22 years, Philip (eventually Phillip II of Macedon) turned against the Illyrians as well as the Thracians, the Paeonians and the Athenians.\(^6^9\) In 359 BC, he restored the lands in Upper Macedonia permanently and two years later, he conquered Amphipolis.\(^7^0\) At the same time, he managed to take hold of the gold and silver mines in Upper Macedonia, which were rebranded under the name of Philippi, and brought up to 1,000 talants a year.\(^7^1\) The retreated of the Athenians from the Macedonian costs led to the conquest of Methone in 354 BC. Other lands were also annexed to Macedonia under Philip and in 352 BC he was elected the leader of the Thessalian Confederation and was involved in the Third Sacred War.\(^7^2\)

At that time, only two independent powers remained in northern Greece – Macedonia and the Chalcidian League. Their unavoidable conflict finished in 348 BC, with the demolition of Olynthus and Stagiros as well as the characterisation of the civic territories of the league’s members as royal territories.\(^7^3\) However, Philp wanted to have good relationships with the Athenians and the rest of the Greek powers, because he would need their help and support in the future, when he was planning to start an expedition against Asia Minor. However, his plans were not met enthusiastically by the city-states and especially Athens, then under the influence of Demosthenes.\(^7^4\) In 340 BC, a new sacred war provoked more conflict among the Greek cities and the battle between the Athenians and the Macedonians (as well as their

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\(^6^8\) Hornblower 1996, 82.  
\(^6^9\) Ginouves 1993, 49.  
\(^7^0\) Hornblower 1996, 83.  
\(^7^1\) Hornblower 1996, 83.  
\(^7^2\) Hatzopoulos 2012, 5.  
\(^7^3\) Ginouves 1993, 52.  
\(^7^4\) Ginouves 1993, 52-3.
allies) at Chaeronea in 338 BC ended in favour of the Macedonians. At this point, Philip’s supremacy was incontestable. He gathered a Pan-Hellenic congress, which resulted in peace and the creation of the Hellenic Alliance. The purpose of this alliance, which evolved into the League of Corinth, was to initiate war against the Persians in order to retaliate the destruction of the Greek temples by Xerxes and liberate the Greek population of Asia Minor. In 336 BC, everything was ready for the first expedition, but in October of the same year, Philip II of Macedon was assassinated while watching a play at the theatre of his capital, Aigai.

From the moment he seized power, Philip was faced with many problems, the most important of which was the unification of the disparate kingdoms of Macedonia. However, through his reign he managed to unite the core of Old Macedonia, which was Lower Macedonia, the rural kingdoms of Upper Macedonia which have been rebellious diachronically, new territories conquered by the Temenids and the Argeads before him to the east of Axios as well as territories the valley of Axios, the region of Chalkidiki and Strymon. Continuing from his predecessors, Phil managed to change the political landscape of Macedonia for good, dividing the territory into smaller civic and administrative territories. He cut coinage that led to wide distribution of goods and services and agricultural economy became settled and flourished. His assassination led to general revolt in southern and northern Greece; however, this situation changed when 20-year old Alexander ascended to the throne.

Philip’s son proved to be a worthy son of this father. Within two years, he managed to restore the equilibrium of power in northern Greece and his authority in southern

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75 Ginouves 1993, 53.
76 For different accounts of Philip’s assassination and the motives behind it see Diodorus 16.91-5 and Justin 9.7.
77 Roisman 2010, 165.
Greece. In the spring of 334 BC, he fulfilled the dream of his father and he became the leader of the Greek expedition in Asia. A series of important victories over the Persians in Granikos, Issos and Gaugamela turned him into the undisputable master of the Near East. Besides his leadership of the Greek army in Asia, Alexander was also king of the Macedonians and chief of the Hellenic Alliance. And it was a common secret that none of his successors would be able to rule his vast empire.

Following his death in 323 BC in Babylon, his lieutenants and companions destroyed the Hellenic Alliance following the aftermath of the Lamian War (323-22 BC). Unable to cooperate with one another, they turned against each other and the empire was broken into many different pieces. The kingdom of Macedonia fell to Cassander, who proclaimed himself king in 305 BC. This was the end of the Temenid dynasty. After his death, less than a decade later, the conflict between his sons gave the opportunity to Demetrios I Poliorcetes to seize power and proclaim himself king of Macedonia. He moved the capital from Thessaloniki to Demetrias, but was eventually more interested in restoring Alexander’s kingdom rather than the people of Macedonia. Estrangement among the Macedonians hurried his dismissal in 287 BC, and the power was divided between Pyrrhus and Lysimachos, who was already the ruler of Asia Minor. However, this arrangement did not last for long. In 285 BC, Lysimachos decided to usurp the power from Pyrrhus and he became the sole ruler of Macedonia up until his death in 281 BC. His subjugator, Seleukos I Nikator, did not live to

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79 Renault 2001, 63-5.
80 Roisman and Worthington 2010, 192.
81 Green 2007, 320ff.
82 For different accounts of his death see Plutarch’s Alexander 75.1 and Diodorus 17.117.
83 Green 2007, 38.
84 Green 2007, 38.
87 Justin 15.3-4, 16.1.
be the next king of Macedonia. He was murdered by Ptolemy Keraunos, who became the new king until the Gallic Invasion in 279 BC, when he died.88 Two years of turbulence ensued and power was again seized by Antigonos II Gonatas, the son of Demetrios Poliorketes in 277 BC. During his reign Macedonia regained some of its strength and stability. His son, Demetrios II, was able to keep Macedonia’s possessions in the south, but it was not long before an attack of the Dardanians led to his death and the destabilisation of the Macedonian kingdom once more. Since his son, Philip V, was a minor, power was transferred to Antigonos III Doson, who managed to re-establish the Hellenic League under the Macedonian power.89

When he died during a battle against the Illyrians in 221 BC, Philip V, though not entirely of age at the time of his coronation, managed to turn against the Aetolians successfully and formed an alliance with Carthage, entering into war with Rome. The First Macedonian War (215–205 BC) ended with a borderline victory for Philip, an outcome that Romans would neither forget nor forgive.90 The Second Macedonian War in 200 BC lasted three years and ended with the devastating defeat of the Macedonians. Peace was decided on Roman terms and the main condition was that Macedonia should abandon all its outside possessions.91 The Third Macedonian War (171-168 BC) occurred between the king Perseus and the Romans and was won for the Romans. The Romans took definitive control of Macedonian and created colonies at Pella, Dion, Kassandra and Philippi. Macedonia was unified with Illyria, however, the Macedonians managed to keep their language, civic institutions, religion and traditions.92 Worship of the great kings was practised throughout the

88 Green 2007, 46.
90 Green 2007, 295-305.
91 Polybius 16.30-1; Green 2007, 305-11.
92 Livy 42-5.
kingdom. Ultimately, the barbarian invasions of the 2nd c. AD, the religious reforms of Diocletian and Constantine and the introduction of Christianity drastically changed Macedonian society and culture for good.
2.1. The origins of agriculture in northern Greece

The exploitation of plants for the production of food was an important step towards the establishment of agriculture in northern Greece already from the Neolithic period. This new way of food production replaced (though did not totally eliminate) older practices of hunting and gathering. In northern Greece, the transition from hunting to gathering societies that started in the Neolithic and was consolidated in the Bronze Age, is linked with the domestication of plants.\textsuperscript{93} Plant domestication was a lengthy and complex procedure that lasted for many generations and involved the transition from the collection and cultivation of wild plants to the cultivation of domesticated species, in other words, what we know today as agriculture. This process is founded on a long and complex relationship between humans and plants.\textsuperscript{94}

Ethnography reveals that agriculture is a collection of uncoordinated actions based on a system of trial and error throughout the centuries.\textsuperscript{95} The critical point in the relationship between humans and plants can be seen in the transition from wild plants to the control of their reproduction. This is also a sign of organised, rather than nomadic societies. Archaeological and ethnographical evidence from northern Greece suggest that this transition was smooth but not quick. It wasn’t before the Iron Age that agriculture became the most important source of nutrition. Under this context, it is important to understand that

\textsuperscript{93} Valamoti 2009, 33.
\textsuperscript{94} Valamoti 2009, 34.
\textsuperscript{95} Valamoti 2009, 34.
since the domestication of the first plant species already from the Neolithic period in northern Greece, the purpose of the prehistoric man was not to create new species, but find ways to feed himself and his community. Domesticated species were a by-product of this experimentation with the soil and the climate. It is likely that the transition from wild to domesticated plants occurred due to the observation of several patterns (i.e. harvesting wild plants before completing their cultivation circle).96

However, the morphological characteristics of domesticated plants are really important for the archaeologist, since they can provide interesting information on agricultural practices.97 As with other parts of the world, agriculture in Greece does not start at the same time in every place. Nonetheless, one thing is certain – the domestication and cultivation of plants already from the Neolithic period came to the Greek mainland from the Middle East. As a matter of fact, the evidence from the early Neolithic is more indicative than any other type of archaeological material. In Northern Greece, the archaeobotanical material 98 contained in ceramic vessels comes from Nea Nikomedia,99 and Giannitsa among others.100 However, the number of plant remains from these sites are very limited – in some cases, only a few seeds have been found. As such, while these samples are really important for signaling the process from wild plants to domesticated ones, it is really difficult to understand more about the mechanisms that led to such a decision in Northern Greece.

All in all, the Neolithic period in Northern Greece marked the transition from hunting and gathering to organised agricultural societies. This process, however, was gradual and was not consolidated till much later – presumably around the Iron Age. However, most of the

96 Hillman and Davies 1990.
97 Valamoti 2009, 36.
98 See also chapter 3 for more information on the sites and the type of archaeobotanical remains.
99 Van Zeist and Bottema 1971.
100 Valamoti 1995.
domesticated plants, grains and legumes we will discuss in the next section of this chapter, were introduced in Macedonia gradually as evidenced by the archaeological remains. These products formed the basis of the diet of the first inhabitants in the area and continued to be cultivated up to the Roman times with different variations and in different quantities.

2.2. The exploitation of plant and animal resources

Arable agriculture was the main activity that contributed to the diet of people in Northern Greece from the Neolithic period to Roman times. This is because cultivated plants and animals could feed a larger population compared to other activities connected to food collection such as hunting and gathering.\(^\text{101}\) At the same time, the domestication of animals such as sheep, goats, cows, pigs and dogs already from the Neolithic period is deemed important for the progress of agriculture in northern Greece.\(^\text{102}\) Though it is true that animals were kept mainly for their meat and milk, there is evidence to suggest that from the Bronze Age onwards they were also used for traction. This practice was consolidated in later periods.\(^\text{103}\) Below we are going to briefly describe the main crops, which were exploited by the people in northern Greece from the Neolithic to the establishment of the Macedonian kingdom and beyond.\(^\text{104}\) Apart from looking into the basic characteristics and cultivation process of these plants, we will also look into their general use in the lives and diets of ancient people as evidenced mostly by ancient authors and other historical or archaeological sources.

\(^{101}\) Halstead 1981, 314.
\(^{102}\) Halstead 1994, 200.
\(^{103}\) Valamoti 2009, 13.
\(^{104}\) For the archaeological evidence see chapter 3.
2.3. Cereals

Cereals (fig. 3), which include some of the earliest species to be domesticated by man, consist of annual grasses grown primarily for their large grains which provide a complex carbohydrate food source and may easily be stored without being spoilt for long periods of time. The cereals so far reported from excavation sites in Macedonia from prehistory to Roman times include wheat (*Triticum*), barley (*Hordeum*), oats (*Avena*) as well as rye (*Secale*) and different types of millet (a type of oat) to a lesser extent. Macroscopically, all these species bear certain similarities. All of them consist of a stem in the form of a dense spike (wheat, barley, rye) or a spreading panicle (oats). The spike is made of a central axis that is divided into several segments, which bear smaller spikes. The length of the branches varies for each species.\(^{105}\)

After they were threshed, winnowed and ground to coarse or finer groats on saddle querns, cereals were used either for the production of bread or porridge. They were important mainly because they were a great source of carbohydrates and also provided the daily supply of vitamins B and E. Bread, in particular, could be made from one type of cereal or from several cereals mixed together. The discovery that bread could rise may have been accidental; however, the bread which has not been leavened has very little taste (if any). Yet, both types of bread were produced throughout antiquity.\(^{106}\)

2.3.1. Wheat

In modern times, there are two types of wild wheat and fourteen types of cultivated wheat. They can be divided into three groups on the basis of their chromosomes and have

\(^{105}\) Renfrew 1973, 189ff.

\(^{106}\) Renfrew 1973, 191.
different names. The most common ones found in archaeological sites are the monocot, dicot and a hard species of wheat known as durum (fig. 4). The second species is most prevalent in the Middle East from the Neolithic period onwards, however, it is the monococcum species that appears more frequently in assemblages in Northern Greece from the Neolithic period onwards. This occurrence has made scholars propose that this type of wheat was a ‘group identity signifier’ in northern Greece and especially Macedonia.\(^{107}\)

The best wheat crops are harvested in areas which have a comparative high winter temperature and frequent rainfall.\(^{108}\) Even today, Macedonia meets these conditions and it is reasonable to think that the same would have applied from the Neolithic onwards. More specifically, the distribution of the rainfall is of great importance – moderately heavy rain in the summer when the shoots are in full growth is ideal; however, heavy rain in the autumn can delay their development and result in smaller grain yield.\(^{109}\) Wild wheat has great adaptability and can survive in low soils and warm climates or high soils and cold climates equally. Domesticated wheat is equally adaptable but cannot sustain very low temperatures or exceptionally high soils. In terms of soil adaptability, wheat does not develop well on loose sandy, peaty or clay soils. The ideal soil for wheat cultivation should be stiff and well drained. This is needed for the conservation of water supplies as well as the production of the conditions that will lead to the creation of protein within it.\(^{110}\) As Theophrastus puts it,\(^{111}\) domesticated wheat ‘exhausts’ the soil more than any other cereal or crop.

Wheat has been important for the human diet diachronically as it forms the basis for the creation of bread. Wheat was threshed and grinded into coarse flour, which could be

\(^{107}\) Valamoti 2009, 38.  
\(^{109}\) Renfrew 1973, 66.  
\(^{111}\) 2.199.
either weak or strong. Strong flour contains a higher percentage of gluten in the grain which makes it more elastic and porous, whereas weak flour tends to produce compact and brittle bread. Low rainfall, rich soil and a dry and sunny ripening period contribute to the cultivation of strong wheat. It is almost certain that this division was known to man already from the prehistoric period since remains of porridge and gruel have been found within the stomachs of mummified bodies throughout Europe. 112

As most agricultural products, wheat requires preparation in order to be planted. This preparation usually involves fertilising the land during the winter along with ploughing and grazing the soil. These steps are essential for the plan to prosper. Making the soil as even as possible will also ensure that the harvest will be suitable. Nowadays, these activities are done with the help of machines; however, in ancient times they were completed with the help of domesticated animals. The harvesting of wheat takes place anytime between the months of May and October. The choice of month depends on many factors, the most important of which is the climate. The summer months are ideal for harvesting wheat because high temperatures have already dried the plant and make it ideal for processing and consumption.

2.3.2. Barley

Just like wheat, barley (Hordeum vulgare) is a cereal which is very important in agriculture diachronically as it is used to feed animals. Nowadays, there are many varieties of barley, all of which consist of hollow stems and spiked main bodies where the barley seeds are shaped. The first archaeological testimony for barley comes from Neolithic Israel, where it marked the transition from hunting and gathering to agricultural societies.113 In the Greek

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113 Alcock 2005, 33.
Neolithic, the representation of barley compared to wheat in Northern Greece is limited.\textsuperscript{114} Whether this is the result of the absence of evidence or a ‘cultural’ choice, remains open to further investigation and debate. Two-row barley is the species that occurs most in Greece; however, in Macedonia, its presence is sporadic up to Roman times, and barley does not appear to be used as much as wheat.\textsuperscript{115}

Just like wheat, barley requires well-drained and fertile soils in order to prosper and thrive. The ideal soil for the cultivation of barley contains high contents of nitrogen. However, unlike most cereals, barley is very tolerant in saline and alkaline conditions, but is equally more sensitive to acid soils. Because of its tolerance in alkaline environments, barley can be cultivated on chalk and limestone soils.\textsuperscript{116}

Today, barley is mostly used to produce malt and is the main ingredient in beer and whiskey. In the classical period, barley grains were used for making a type of porridge. Pliny describes how the Greeks soaked the barley grain, dried and grounded it, mixing it with flax and coriander.\textsuperscript{117} Barley was also used for the production of bread throughout antiquity, though it is less suitable for this compared to wheat. Last but not least, barley was used for feeding animals and Pliny, in particular, recommends it for increasing animal musculature.\textsuperscript{118}

2.3.3. Rye

Rye (\textit{Secale cereale}) is a cereal that is grown as a grain and is closely related to wheat and barley. Rye is used primarily for bread but it can also be used for alcohol production and animal fodder. Rye is a cereal grain and should not be confused with ryegrass, which is used

\textsuperscript{114} Valamoti 2004, 47.
\textsuperscript{115} Valamoti 2004, 70.
\textsuperscript{116} Renfrew 1973, 81.
\textsuperscript{117} Natural History 18.14.74
\textsuperscript{118} Alcock 2005, 34.
for pasture and hay for livestock. Domesticated rye dates already from the Neolithic in the Mediterranean, but it appears much later in central Europe. Rye was also used extensively in Roman times, though Pliny describes it as a ‘very poor food that only serves to prevent starvation’.\footnote{Alcock 2005, 34.}

Rye is cultivated in cold climates and it can be sown in very low winter temperatures. It is a very versatile crop since it can withstand most types of weather except heat. As a matter of fact, it sprouts and grows more quickly in colder climates. The fact that it is collected in the winter enables it to escape from the summer heat and lack of rainfall. Unlike barley and wheat, rye can adapt to the soil more easily. Today, rye grows primarily in places with lighter soils and limited rainfall. It requires a relatively dry soil in order to thrive, but can tolerate alkaline and acid soils. Rye has an extensive and deep root system (up to 1.8 meters below ground) and perhaps this is the reason why it performs better in dry climates or not that nutritious soils.\footnote{Renfrew 1973, 85.}

\subsection*{2.3.4. Oats}

Wild oats were collected in the Mediterranean up to 11,000 years ago.\footnote{Alcock 2005, 34.} Pliny informs us that the German tribes prepared a type of pulse from them, but Greeks and Romans used them mainly as animal fodder.\footnote{Alcock 2005, 34.} Oats (\textit{Avena sativa}) as we know them today were domesticated in the Middle Easter and Europe and made their way into the Mediterranean. Oats are better adapted to cooler climates and wet lands. A special type of oat, however, \textit{Avena byzantina}, performs better in regions with warm climates like those in the

\footnote{Alcock 2005, 34.}
\footnote{Alcock 2005, 34.}
\footnote{Alcock 2005, 34.}
\footnote{Alcock 2005, 34.}
Mediterranean. Compared to most cereals, oats require a considerably amount of water for their growth and development. However, they can survive with less sunshine than most cereals. Hot, dry weather can contribute to their premature ripening and hot, humid weather makes oats more susceptible to disease. Oats which are cultivated in the winter are less resistant to cold compared to winter forms of wheat, barley and rye. Unlike wheat and barley, they are less sensitive to soil conditions and can thrive on silt and clay soils.

In modern times, oats are incorporated into our diet and are most frequently consumed as porridge. Remains of oatmeal have also been found in the stomach contents of prehistoric men and oatmeal was probably the Tollund man’s last meal. Nonetheless, oat flour does not contain any gluten and for this reason, it cannot be used for bread making without the addition of other flours. Oats are widely used for feeding livestock and this must also have been their use throughout antiquity. Interestingly, oat flour contains a substance that delays the appearance of rancidity in fat products and for this reason, it might have been used for increasing the life of products such as butter and curdled milk. The Romans were also using oats in order to prepare a special type of malted beer.

2.3.5. Millet

Millet is a small seeded grass of the oat family that spread to Greece and Rome and then Western Europe from the Caucasus, where it was growing already from 5,000 BC. Millet does not require special growing conditions, but usually responds well to high-fertility and moisture. Products made out of millet have high nourishing value, since they contain

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123 Valamoti 2009, 52.
124 Renfrew 1973, 98.
125 Renfrew 1973, 98.
126 Alcock 2005, 34.
127 Alcock 2005, 34.
proteins, lipids, and carbohydrates. In antiquity, millet was used for the creation of porridge. However, during periods of famine, it could also be mixed with lard and olive oil.

2.4. Legumes

Legumes (or pulse crops) are plants which are cultivated mainly for their seeds known as pulse. In Modern Greek society, legumes are equally important to bread, oil and wine, the so-called Mediterranean triad. A similar picture must have occurred already from prehistoric times as archaeological finds suggest. Legumes are high in protein and their elevated nutritional value make them an ideal substitute for meat. Common legumes cultivated in the Mediterranean diachronically include beans, lentils and chickpeas. Lentils, in particular, are the most common legumes discovered in archaeological sites in Northern Greece and Macedonia.

Broad beans (Vicia faba) or fava beans were consumed by different groups of people in classical antiquity. They were introduced to the Mediterranean from Middle East already in prehistoric times and were gradually domesticated. Beans were quite versatile and could be eaten raw, boiled or roasted. Beans were also grounded and added to bread flour. Besides their important role in nutrition, beans were also used for ritual purposes – for instance, as an offering to the gods. However, ancient writers were aware of the side

128 Renfrew 1973, 103.
129 Alcock 2005, 34.
130 Valamoti 2009, 71.
132 Valamoti 2009, 71.
133 However, Valamoti (2009, 80) notes that we cannot be entirely certain about the way they were prepared in prehistoric times. They could be roasted in ceramic vessels as some charring from Neolithic assemblages suggests, but they could also be boiled. In any case, boiling would require special preparation because they are not always well tolerated by the human stomach due to their hard casing. Even today, beans and chickpeas are left to soak in water for a few hours before prior to their preparation or even overnight.
134 Alcock 2005, 35.
effects of eating beans such as flatulence, and Pliny, in particular, writes in more than one instances that consuming beans could ‘haze the vision’.\textsuperscript{135}

Most varieties of beans are very versatile and can be cultivated in most types of soil. They can be cultivated in grounds which are loamy, sandy, rocky, or even clayish. However, beans need plenty of sunlight and require ground that drains well in order to thrive. Common bean diseases appear in wet soils, and the roots of the plant may not get enough oxygen with water and mud blocking their air channels.\textsuperscript{136}

Chickpeas (\textit{Cicer arietinum}), on the other hand, are one of the older and most used pulses known to man. They were first grown in the Near East around 8.000 BC. As with most grains and legumes, they were first gathered from the wild, but were eventually domesticated and incorporated into the diet of prehistoric man. In ancient Greece, chickpeas were eaten raw, roasted or boiled, though they were rarely presented as the main meal. Instead, they were served as ‘tragemata’,\textsuperscript{137} which were commonly consumed during the symposium. However, chickpeas were not only destined only for the rich. They were actually very cheap to buy and were quite satisfying especially when they were boiled into a soup. For this reason, in Roman times they were often labelled as the food of the poor.\textsuperscript{138}

Chickpeas thrive in well-drained and clay soils that are neutral to alkaline and have good water holding capacity. They will tolerate low temperatures at their early cultivation stages, but once they flower, they should be protected from extreme temperatures. Chickpeas are usually cultivated in rotation, appropriate to a sequence with most cereals.

\textsuperscript{135} Natural History 18.117-12; 22.140-1.
\textsuperscript{136} Renfrew 1973, 122.
\textsuperscript{137} A type of snack or hors d’oeuvre (Alcock 2005, 36).
\textsuperscript{138} Martial, Epigrams, 1.103.
Most farmers allow a minimum of four years between chickpea crops in the same soil to minimise the risk of diseases.\textsuperscript{139}

Last but not least, lentils (\textit{Lens Culinaris}) have been an important part of human diet since prehistoric times. Valamoti reports that they have been a substantial part in the diet of Macedonia, since they are the most common legume found in archaeological sites in northern Greece, which have been explored archaeobotanically.\textsuperscript{140} Remains of wild lentils are known from Syria around 7.500-9.200 BC, where they were gradually introduced into the Mediterranean. Lentils were consumed as a soup along with other vegetables and herbs, but they could also be boiled and flavoured with spices.\textsuperscript{141} As with chickpeas, they were mainly consumed by the lower classes.

Lentils are a cool-season legume and they thrive during winter time. Once they are cultivated, they required 80 to 110 days to fully develop and harvest. As most legumes, lentils need well-drained soil in order to thrive. They grow best in slightly alkaline soils and have no serious disease problems. Once harvested, they are either used as dry beans or peas. Dry lentils can be stored for many months (almost a year), and this is another reason to believe that they were favoured by people in antiquity.\textsuperscript{142}

\section*{2.5. Fruit}

In modern times, wild apples can be found throughout Europe and there is every reason to believe that the same occurred in the prehistoric period. Finds of wild apples are common in many European sites from the Neolithic period onwards and these fruit are

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\textsuperscript{139} Renfrew 1973, 124.
\textsuperscript{140} Valamoti 2009, 71, pl. 5-6.
\textsuperscript{141} Anthimus, OC 67; Galen 6.527-8.
\textsuperscript{142} Renfrew 1973, 126.
\end{flushleft}
considerably smaller than their domesticated counterparts. Wild berries, on the other hand, have been discovered in many archaeological assemblages in northern and Mediterranean Europe. People have been using them diachronically for sweeteners, while some of them (i.e. elderberries) could also have medical properties. Figs were transported to Europe and the Mediterranean from the Near East. They can be eaten fresh straighten from the tree, but they are mostly sundried. Their ability to dry under the sun and store for longer periods of time, plus their natural sweetness, made figs quite popular already from the Neolithic period. In the Iliad, Homer describes how ‘the busy fig-juice thickens milk and curdles the white liquid as one stirs’. This property of the fig may have also been discovered by the prehistorical man. Many authors, including Herodotus, Aristotle and Pliny, described the practice of planting wild and cultivated fig trees next to each other. In classical antiquity, figs were very popular and quickly became a staple in the Greek and Roman diets, since once dried, they could be consumed even during wintertime.

2.6. Olives and olive oil

Domesticated olive as we know it (Olea europaea sativa) probably derives from Olea chrysophylla, a wild species domesticated in the Near East. However, research has shown that the olive tree is native to the Mediterranean basin already from the mid-Holocene and well before the Neolithic period. Olive trees are very long-lasting and strong, especially in drought conditions. Although the olive tree will also grow in tropical areas, it will not produce fruit without a cool winter. Olive trees can survive in the heat (almost over 40 degrees

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144 5.116.
145 Herodotus 1.193; Aristotle, Historia Animalium, Pliny, Natural History 15.81-82.
146 Foxhall 2007, 5.
Celsius), but will be destroyed by extremely cold weather.\textsuperscript{147} For this reason, it is obvious why the olive tree thrived in the Mediterranean basin since prehistory and continues to do so in modern times.

The cultivation of olive trees was central to the Greek and Roman civilisation. Bread and olives were the main food of the lower social classes, while olive oil was treasured for its taste and unique health qualities. Many ancient authors provide detailed instructions on the cultivation and storage of oils as well as the production of olive oil. According to them, the best way to preserve oils was by layering them with fennel in brine containers. Olive oil, on the other hand, should be stored in the dark in order not to lose its beautiful, golden colour and be airtight in order to avoid oxidisation.\textsuperscript{148} Diachronically, the ideal storage vessel for olive oil in the Mediterranean was the amphora and this is no different for Macedonia from the classical period onwards.

Olive oil was used for cooking, marinating and preserving food. Oil derived from the oil tree was also used for lighting the oil candles, wood sealing and lubrication in various manual professions. However, besides its important nutritional value and practical uses, the olive tree also had symbolic value. Greeks and Romans used olive wreaths in order to honour athletes, soldiers and citizens.\textsuperscript{149} Olive oil was also used in ritual practices along with wine (i.e. libations to the gods or the deceased). Pliny reports that ‘happy life is one that uses wine inside and olive oils outside’, however, he warns against keeping both products for a very long period of time.\textsuperscript{150}

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\begin{enumerate}
\item[\textsuperscript{147}] Foxhall 2007, 5.
\item[\textsuperscript{148}] Cato, DA 6.18-19; Pliny, Natural History 15.1-24.
\item[\textsuperscript{149}] Alcock 2005, 87.
\item[\textsuperscript{150}] Pliny, Natural History 15.1-24.
\end{enumerate}
\end{flushright}
The olive tree is very resilient and can adapt well to the semi-dry environments in which it flourishes. Its tough and leathery leaves preserve as much water as possible and minimise the amount of water loss during transpiration. The olive tree has a shallow but sturdy root system that takes advantage of the water and nutrients in the ground and absorbs them to the greatest extent possible. The olive tree remains always green shedding leaves gradually throughout the year. However, its main development occurs between April and September, followed by a period of rest between November and March. The vegetative growth of the olive tree is very dynamic and can occur on any part of the tree, even on very old trees. However, grafting and propagation are recommended for optimal production.\footnote{Foxhall 2007, 15.}

These processes are very easy and have probably contributed to the domestication of the plant already from prehistory.

As far as the extraction and procession of olive oil in antiquity is concerned, the secondary literature depends on a lot of Roman practices. However, many scholars maintain that the same practices should have been followed by the Greeks already from prehistory.\footnote{For an overview and discussion see Foxhall 2007, 131ff.}

Greek farming was of a smaller scale and less professional than Roman farming and agriculture, best understood from the very well-documented archaeological sites of large farming estates in Italy, Egypt, North Africa and the Levant.\footnote{Foxhall 2007, 131.} The small scale of Greek agriculture and farming suggests that the equipment used for the processing of oil were fairly basic and multi-purpose. While a press is required for larger amounts of oil production, small amounts of oil could have been produced without the use of specialised equipment. More importantly, the choice of equipment is directly dependent on specific economic and cultural choices, and with the place of the olive tree within them. In Macedonia, while there is limited
evidence that oil production and consumption occurred in prehistoric times, we have evidence for oil production from the Classical and the Hellenistic period as we shall see in more detail in the next chapter.

2.7. Grapes and the production of wine

A grape is a berry, which derives from the flowering plant of the genus *Vitis*. Grapes can be eaten fresh as fruit or they can be used for making wine and other products (i.e. jam, juice etc). Wine was produced in big quantities by the Greeks and the Romans and the consumption of wine occurred in various social situations, the most prominent of which was the symposium.

Vine cultivation requires soils heavy in nutrients which are capable of sustaining moisture. However, the tastiest wines come from vineyards with a high proportion of stones or gravel in the soil. Virgil offers a helpful tip for optimal vine cultivation: ‘bury in the ground 30 stones or rough shells – for the water will glide between them and invigorate the plants’.

Depending on the type of cultivation, grapevine varieties suit a range of climates, from cold European to warm Mediterranean ones. However, soil consistency and moisture are more important than the weather. In general, grapevines grow best in well-drained, slightly acidic soil that is neither deficient in nutrients nor overly rich.

Both wild and cultivated grapes can be eaten as fresh fruit; however, domesticated grapes are larger and more succulent. That wild grape was used for nutrition purposes by early men is evidenced by Neolithic and early Bronze Age remains in northern Greece, as we shall see in the next chapter. In some places, they occur together with the pips and stones of

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other wild fruits – possibly the leftovers of wine-making or brewing. It was the
domestication of the vine, however, that led to the systematic production of wine. This
process involves the fermentation of the sugar content in the grape juice. Red and white
wines are distinguished by the presence or absence of specific pigments in the skin of the
grapes (provided that the skins are present in the early stage of the fermentation). Typically,
sweet wines contain up to 18% sugar, whereas dry wines may have less than 2%. In sweet
wines, the fermentation process may be stopped early with the addition of alcohol for the
preservation of sugar. In dry wines, on the other hand, the fermentation process is completed
until most of the sugar is used up. The wine is subsequently stored and aged in wooden
containers. The ageing process involves slow chemical changes that improve the colour,
flavour and consistency of the wine.

The Greeks and the Romans experimented with their wine and often added herbs to
make it tastier. It could be diluted to prevent drunkenness. Greek wine in the Classical period
came from local vineyards and can be paralleled to modern ‘vin ordinaire’. It seems that
the Greeks did not have a deep appreciation of vintage wines, since most wines were
consumed while they were still young. Some cities, however, were renowned for high-quality
wine, such as Chios and Samos. Chian wine was so popular and a major source of revenue for
the island through trade, that the Chians depicted the amphora on their coinage. Apart
from its consumption socially, wine was also used as an antiseptic or for digestion as well as
for libations to the gods and the deceased.

156 Valamoti 2009, 91.
158 Alcock 2005, 92-3.
159 Alcock 2005, 93.
160 Renfrew 1974, 132.
CHAPTER 3

The archaeological evidence

3.1. The archaeological evidence of agriculture in Macedonia – an uneven picture

In this chapter we are going to discuss in more detail the archaeological evidence for agricultural activities in Macedonia from the Neolithic to the Roman period. The main crops represented at most of the sites discussed in this chapter include emmer (*Triticum dicoccum*) and, to a lesser extent, einkorn (*Triticum monococcum*) wheat, legumes and fruit. Evidence for the production of wine appears already in the Neolithic at the site of Dikili Tash, while olive oil was produced in larger quantities in the Classical and Hellenistic periods. Our attempt to collect the main sites and their archaeological remains connected to agriculture in Macedonia is not exhaustive by any means. On the one hand, systematic archaeobotanical studies over the last ten years have focused on prehistoric sites and as a result, we have more information on prehistoric agricultural practices in northern Greece. On the other hand, while a lot of excavations are still ongoing, full publications tend to be scarce. For reasons of practicality, the evidence in this chapter is going to be divided chronologically rather than thematically. This division will enable us to look into the similarities and differences from period to period and examine whether there was a continuity or change in agricultural practices in Macedonia from prehistory to Roman times. We hope that this overview followed by the discussion of the archaeological finds and their significance within their wider cultural context, will contribute to the continuing scholarship of agricultural practices in ancient Greece and its significance in modern terms.
3.2. The Neolithic period

Representative archaeological evidence of Neolithic farming practices in northern Greece come mainly from Nea Nikomedia,161 Thermi,162 Stavroupoli,163 Dispilio,164 Dikili Tash,165 Giannitsa,166 and Makriyalos.167 From the early Neolithic settlement of Nea Nikomedeia in northern Greece (ca. 5470 B.C.), which had a population of 500 to 700 people throughout the Neolithic, the following plant species could be recognised: different types of wheat such as einkorn and emmer (\textit{Triticum monococcum} and \textit{Triticum dicoccum} respectively), barley (\textit{Hordeum vulgare}) and lentils among others.168 The excavations have revealed two types of buildings which are associated with the agricultural and stock-raising activities of the settlers. In the earliest phases of the settlement the houses were square and consisted of wooden columns made of thin tree trunks. The walls were built with thin twigs and canes and they were plastered internally and externally with a mixture of clay for waterproofing purposes. In later phases, the houses were more elongated with narrow corridors, but they were still made of the same materials. The production of food is evidenced by culinary structures such as hearths and ovens, and assorted materials such as pots, various types of vessels where charred plant remains were found. The economic activity of the settlers was centered on farming and livestock. However, the amount of farming needed was limited to the needs of the population.169

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161 Van Zeist & Bottema 1971.
163 Margariti 2002.
164 Mangafa 2002.
165 Valamoti 2015.
166 Valamoti 1993.
167 Pappa et al. 2013.
168 All of them were found carbonised.
The Neolithic settlement of Thermi near Thessaloniki was discovered since 1987 and ever since various rescue excavations have taken place, revealing a significant part of the settlement.\textsuperscript{170} The core of the settlement consisted of wooden dwellings with stone foundations, while the area is delineated by trenches. The older buildings date to the middle Neolithic period (5800–5300 BC) to the end of the Late Neolithic II (4800-4500 BC).\textsuperscript{171} The domesticated plant species that have been recognised belong mainly to the wheat family. More specifically, emmer, einkorn as well as hard wheat (durum) were found.\textsuperscript{172} Lentils were also discovered in very limited numbers.\textsuperscript{173} All the plant remains were charred and come either from segments of the settlement that were destroyed by fire or from stone-paved floors.\textsuperscript{174} Archaeobotanical research has shown that most of these remains had been processed and were destined for food consumption. The presence of stone grinders\textsuperscript{175} suggests that the grinding of the cereals was a limited-scale activity that took place within the settlement at various stages of the Neolithic period. However, it is unlikely that flour was stored in quantities. Since the evidence is limited, we cannot tell whether the cultivation of wheat was a systematic activity. Moreover, the presence of a few lentils and other pulses, cannot suggest a conscious nutritional preference. It is possible that these pulses were merely the by-products of growing weeds rather than the products of organised agriculture. In any case, the sample is really small and cannot be considered indicative of continuous agricultural practices on the site.

\textsuperscript{170} For the ongoing excavations see Pappa et al 2011.
\textsuperscript{171} Pappa et al 2011, 343.
\textsuperscript{172} Valamoti 1992, 444.
\textsuperscript{173} Valamoti 1992, 445.
\textsuperscript{174} Valamoti 1992, 449ff.
\textsuperscript{175} Valamoti 1992, 450.
Stavroupoli is a Neolithic settlement located on a hillock near the modern town of Thessaloniki. Ongoing rescue excavations in the area have brought to light various phases of the settlement dating from the middle (5800–5300 BC) to the late Neolithic period, which at Stavroupoli corresponds to the time period between 5890 and 5531 BC. The houses had rectangular plans and their floors were plastered. As in other Neolithic settlements in Macedonia, ovens and hearths were located both inside and outside the houses, suggesting that cooking took place in private and in public. Common species found in the settlement include emmer, einkorn, hard and soft wheat as well as barley. Again, only a limited number of pulses and legumes were found, the most prominent of which were lentils. However, the site has produced evidence for fruit such as grapes (Vitis vinifera) and figs (Ficus carica) as well as a single olive pit (Olea europaea). Investigation of the charred wheat deposits suggests that all varieties of wheat were cultivated in limited numbers in specific areas of the settlement. As far as barley is concerned, there is no evidence to propose that it was agriculturally exploited for nutrition. It was most likely used as animal fodder. The archaeobotanical evidence from Neolithic Stavroupoli is fragmented and we cannot say for certain that it represents the entirety of the settlement practices, since excavations are still pending. Moreover, it is very badly preserved and cannot add much information to our knowledge of agricultural practices on the site during the Neolithic. Future excavations may bring to light more substantial archaeobotanical remains and join the puzzle.

Neolithic Dispilio is an archaeological site that was built on an artificial island near on Lake Orestiada in Kastoria. The lake settlement was unearthed during the dry winter of 1932,
which reduced the water in the lake and revealed stone foundations of wooden huts. Excavations began in 1992, and the settlement was inhabited for a long period of time – roughly from the Middle (5600-5000 BC) to the Final Neolithic (3000 BC).  

Archaeobotanical remains were charred in their entirety and consisted of different types of wheat (emmer, einkorn, soft and hard wheat), barley, lentils and chickpeas. Archaeobotanists have also recognised very limited quantities of fruit such as figs, wild pears (*Pyrus amygdaliformis*) and berries (*Rubus fruticosus*). As with most Neolithic sites in Northern Macedonia, wild plants and weeds were also mixed along with the archaeobotanical remains, suggesting that the settlers had a mixed diet consisting of agricultural products and wild fruit. Careful study of the wheat remains has revealed that they were prepared for cultivation. This is because they were not coated by their hard casing and therefore were not destined for animal fodder. Emmer and einkorn were cultivated extensively throughout the main phases of the settlement and they were destined for the production of bread and other wheat products. Barley and legumes, on the other hand, were found in very limited quantities and there is no definitive evidence to suggest that they were cultivated systematically. They could be either animal fodder (barley) or mixed with weeds and wild plants (chickpeas, lentils). The archaeological remains from Dispilio suggest that agricultural production was specialised and was centred on wheat. This is a different image for most Neolithic settlements in Macedonia, where different types of wheat were also cultivated but not systematically.

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181 Hourmouziadis 2002.
182 Mangafa 2002, 119-120.
183 Mangafa 2002, 121.
186 Mangafa 2002, 121.
**Dikili Tash** is a tell site in the south-east part of the plain of Drama, near the site of Philippi. Its habitation spans from the early Neolithic to the Bronze Age, while it was also reoccupied in the Classical period up to Byzantine times. Archaeobotanical materials have been gathered and analysed and most of them date to the late Neolithic period. These remains were found in the Neolithic houses of the settlement. House 1 (fig. 5), in particular, is really important because it is there that 2,460 grape pips and more than 300 grape pressings were discovered in 1989.\(^\text{187}\) A variety of cultivated plants and harvests from wild plants growing beyond the fields were stored and preserved inside House 1 shortly before its destruction in the late Neolithic. All plants were discovered in a fully processed state, ready for consumption or for further processing for consumption. These included wheat, barley, rye and fruit. The presence of so many grape pips in House 1 has stirred much discussion among scientists, especially regarding the possibility of wine-making in this early period.\(^\text{188}\) Subsequent excavations have brought to light more grape pips, which seem to be associated with a coarse-ware clay pot, where tartaric acid was found. This discovery suggests that the grape pips and their skins were contained within the pot along with a liquid containing tartaric acid before the destruction of the house by fire. While tartaric acid can be found in a wide range of grape by-products, the presence of grape remains and grape pressings on the same site, attest to a process of fermentation that led to wine-making. Preliminary analyses of the grape pipes suggest that they were wild; however, the excavator believes that this does not necessarily implies that they were gathered from grapevines growing in the wild.\(^\text{189}\) It is plausible that vines around the settlement were tended, or even cultivated and this led to a

\(^{187}\) Valamoti et al. 2007, 55.

\(^{188}\) Valamoti et al. 2007, 61.

\(^{189}\) Valamoti 2015, 42.
lengthy and stable process of grape domestication. The archaeobotanical remains within House 1 at Dikili Tash are really important because they signify the transition from gathering from trees to fruit growing and viticulture in the region. Whether grapes were harvested from the wild or tended and cultivated by the settlers may not be that important, since they were eventually stored along with other agricultural products and were destined for mass consumption.

The Neolithic settlement at **Giannitsa** has also produced evidence for early agricultural practices in Macedonia. The Neolithic settlement (known as settlement B or Giannitsa B) was discovered under a toumba, on the southern hill of the city, near the old market and dates from the late 7th to the early 6th millennium BC. The plant remains that have been examined include wheat (emmer and einkorn), barley as well as millet in terms of cereals. Lentils and other undomesticated fruit have also been found. Evidence that domesticated wheat species were cultivated on the site, comes in the form of a stone sickle, whose remains were found within the settlement. As in most Neolithic sites in Macedonia, the plant seeds were already charred upon discover and that is probably the reason why they survived. Wheat makes for the largest part of these remains (mostly emmer). Most of the seeds in the settlement were found within a clay construction. The exact use of this constructions has not been clarified. Maybe it was a storage space or a deposition space after a fire that resulted in the charring of these seeds. Plant remains at Neolithic Giannitsa contained very little (if any) lentils and fruit. Again, this may be indicative of the nature of the preservation of the evidence at the site or simply a nutritional preference of the settlers. In parallel, the study of

190 Pagnoux et al 2014.
191 Chrysostomou and Chrysostomou 1993.
192 Valamoti 1993, 177-80.
the zooarchaeological remains from Neolithic Giannitsa has shown that pastoralism was based on five domesticated animals: sheep, goats, pigs, cattle and dogs.

Last but not least, excavations at the Neolithic settlement of Makriyalos in coastal Pieria have brought to light the layout of two distinct habitation phases, both of which are dated to the late Neolithic period. The variety and richness of finds have brought together a number of archaeologists, who have attempted to reconstruct the economic and social dimensions of this settlement. As in many Neolithic sites, there is a clear distinction between the public and the private sphere. Archaeobotanical and bioarchaeological studies suggest that the diet of the settlers at Makriyalos was not much different from that of other Neolithic sites in Macedonia. More precisely, einkorn, emmer and soft wheat are the main cereals on the site, while barley and lentil remains have also been discovered. Recognised fruit species include grape, blackberry and elderberry, but they are found in very limited quantities. However, remains of grapes and figs point to systematic harvesting practices from the wild, suggesting a type of viniculture, though not of the same extent as that in Dikili Tash. Barley and other archaeobotanical materials may have also been incorporated in animal dung, suggesting grazing and a certain degree of mobility of the population.

3.3. The Bronze Age

Moving towards the Bronze Age, archaeological evidence from northern Greece that is related to agricultural practices comes mainly from Mesimeriani Toumba, Archontiko, Valamoti 2002, Valamoti 1997.
Assiros\textsuperscript{197} and Megali Toumba.\textsuperscript{198} During this period, people continue to grow the same species found in the previous periods with the addition of. At Megali Toumba in Thessaloniki, there is evidence for mass wine production as derived from charred peels, stems and bare grape seeds.\textsuperscript{199}

The site of Mesimeriani Toumba near Thessaloniki was inhabited during the Neolithic period but the most important phase of the settlement was the Bronze Age.\textsuperscript{200} Surface pottery suggests constant habitation through the centuries and the settlement has been well-preserved because it has not undergone any significant destruction or intervention. Plant remains from the early Bronze Age include hearths were charred remains of wheat (both emmer and einkorn), barley, chickpeas and grapes have been found. Remains from the late Bronze Age include barley, a limited number of chickpeas and some grape remains.\textsuperscript{201} The plant remains at Mesimeriani Toumba do not differ significantly from earlier sites in Macedonia or other contemporary sites. Cereals were cultivated for local consumption but the limited number of the archaeobotanical remains cannot testify to their importance in the diet of the inhabitants of the settlement of Mesimeriani Toumba in the Bronze Age.

On the other hand, plant remains from Bronze Age pits at the settlement of Archontiko near Giannitsa included wheat (emmer and einkorn), rye, barley and lentils. Einkorn wheat was found in larger quantities compared to the rest of the plant remains.\textsuperscript{202} Other archaeobotanical remains include fruit (figs and grapes) and wild, undomesticated weeds. The storage of einkorn wheat occurred in the ΣΤ sector of the excavation. More than

\textsuperscript{197} Jones and Halstead 1980.  
\textsuperscript{198} Mangafa et al. 1998.  
\textsuperscript{199} Mangafa et al. 1998.  
\textsuperscript{200} Grammenos and Kotsos 2002.  
\textsuperscript{201} Valamoti 2002, 316-8.  
\textsuperscript{202} Valamoti 1997, 155-6.
15,000 peats of einkorn wheat were found within the pit and it is plausible to suggest that this was one of the storerooms, which was accessible to the settlers. The excavation of this assemblage is really important because it gives us a clear image of the processing of wheat after its collection. The seed was left intact within its hard casing and this probably happened in order not to spoil as quickly. A similar practice is also observed at Assiros. At this time, we cannot tell whether the conservation of einkorn (or any other type of wheat for that matter) wheat at Bronze Age Archontiko was a common practice, however, by-products of wheat processing and milling have been discovered at other pits of the settlements, suggesting that the seeds were destined to be consumed after storage. These by-products, which were found in significant quantities, could have been used as tinder on hearths or animal dung. Overall, the plant remains from Archontiko suggest that the cultivation of wheat was a common occurrence in the settlement and though we do not know the extent of this practice, it appears that storage provisions were made in the event of a wheat shortage in the settlement.

Assiros Toumba is a Bronze and Iron Age site near Thessaloniki. The reason why it is important for the understanding of Bronze Age agricultural practices in Macedonia, is because archaeologists have discovered charred remains of wheat (emmer and einkorn), barley and other crops in large quantities, stored in an extensive complex within the settlement that dates to 1300 BC. These storage units have been compared with storage rooms in the Mycenaean palaces of southern Greece, where we know from the Linear B tablets that extensive cereal agriculture occurred. Assiros, however, is a much smaller site

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203 Jones et al. 1986.
205 Jones and Halstead 1980, 265-6.
206 Jones 1981, 105-11.
and there is no evidence to suggest that is was ever an administrative centre. Under this light, the large number of seeds has been interpreted as evidence for horticulture on a domestic scale.\textsuperscript{208} Isotopic analyses of the grain from the storage complex at Assiros Toumba has shown that the remains are compatible with a single year’s harvest from a limited geographic area, which suggests large-scale production in the area.\textsuperscript{209}

Last but not least, another important site that has produced evidence for agricultural practices in Bronze Age Macedonia is \textbf{Megali Toumba} in the heart of the city of Thessaloniki.\textsuperscript{210} To date, at least 1999 plant remains have been collected and examined most of which are cereals and legumes (\textit{fig. 6}). Cereals include wheat (emmer and einkorn), a new type of wheat which was introduced in this period and was perhaps the result of agricultural experimentation and barley. The legumes which were identified in the settlement include lentils and chickpeas. Moreover, acorns (\textit{Quercus sp.}) and grapes were also found. More specifically, wheat and barley were discovered in big concentrations in different regions of the two, main building complexes and this suggests that they were cultivated and stored separately. Wheat seeds, however, were mixed by undomesticated plants and this suggests that they could have been used for animal dung. Under this context and given the quantity of the stored wheat and barley, the pastures of the settlement must have been quite extensive.\textsuperscript{211} At the same time, the presence of many charred peels, stems and bare grape seeds in the settlement, which are currently under investigation, suggests that mass wine production also occurred at the site in the Bronze Age.\textsuperscript{212}

\textsuperscript{208} Jones 1981, 110.
\textsuperscript{209} Jones 1984, 52.
\textsuperscript{210} Valamoti 1998.
\textsuperscript{211} Valamoti 1998.
\textsuperscript{212} Mangafa et al. 1998.
3.4. From the Iron Age to the Roman period

The transition from prehistory to proto-history is quite silent in terms of archaeological testimonies of agricultural practices in Macedonia. Apart from Mesimeriani Toumba, where limited plant remains attest to a continuation of the same agricultural practices of the Bronze Age,\textsuperscript{213} a transitional site that has produced evidence for agricultural practices in the Geometric period is Krania, but the preliminary results of this study remain unpublished. At Mesimeriani Toumba charred grains are limited while in Krania they have been found in very large quantities. The types of cereals and grains that have been found in both sites are not different from the species we have already seen in the Neolithic and Bronze Age are not different from what has been mentioned above but interestingly the large quantities of barley and soft and hard wheat at Krania have been found in a storage structure, among a multitude of broken vases which also contained pomegranate seeds (\textit{Punica granatum}) and watermelon seeds (\textit{Citrullus lanatus}).\textsuperscript{214}

The importance of agriculture is signified in other parts human life. For instance, the archaic and early Classical tombs of Sindos near Thessaloniki have yielded a considerable number of grave offerings which are directly related to agricultural practices. Even though only a half of these tombs were actually uplundered upon their discovery, they produced a considerable amount of miniature iron models of agricultural equipment and tools, such as two- or four-wheeled agricultural carts (\textit{fig. 7}). These finds come from the tombs of women, women and children alike and are indicative of the importance of agricultural practices in the daily life and afterlife of these people.\textsuperscript{215}

\textsuperscript{213} Valamoti 2002, 316-8.
\textsuperscript{214} Margariti 2015, 334.
\textsuperscript{215} Del Socorro 2013.
From the Classical period onwards, apart from archaeological data, information for agriculture and various crops are provided in the description of ancient authors (as we have already seen in Chapter 2). Archaeobotanical data in this period derive from the centre of Thessaloniki, and more specifically the Governor’s Square,\textsuperscript{216} Ossa \textsuperscript{217} and farmhouses in Pieria, near the border with Thessaly.\textsuperscript{218}

Rescue excavations at the \textbf{Governor’s Square} in the centre of the city of Thessaloniki in the 1990s, brought to light a public building dated from the 1st c. BC to the 2nd c. AD.\textsuperscript{219} In the north-west part of the building, a room was excavated which was almost completely destroyed by fire. Within the debris, archaeologists discovered more than 15 amphorae, which were carefully deposited along the sides of the room. Within one of the amphorae, charred seeds were discovered. Because of this discovery, samples were taken from each amphora. However, this was not an easy task since the majority of the vessels were broken as a result of the heat. The plant remains that were found within these amphorae were identified as emmer wheat and hard wheat (\textit{durum}). Rye, barley and millet were also found within the amphorae but in smaller quantities. Legumes included broadened beans (\textit{Vicia faba}). However, the most impressive find was a large concentration of sesame seeds (\textit{Sesamum indicum}) and pine shells (\textit{Pinus pinea L}). Grapes and fig seeds were also discovered within the amphorae, again in smaller quantities.\textsuperscript{220} The presence and storage of sesame seeds, beans and pine shells in a public building is almost surprising, since none of these species was a diet staple in the Hellenistic and Roman periods. Sesame, in particular, is valuable because it produces oil that remains fresh for a long period of time. Beans were a

\textsuperscript{216} Mangafa 1995.
\textsuperscript{217} Mangafa 1992.
\textsuperscript{218} Margariti 2015.
\textsuperscript{220} Mangafa 1995, 211-2.
common offering to the gods (see also chapter 2) and, last but not least, pine nuts were used in certain recipes but were also considered a potent aphrodisiac.

Ossa, on the other hand, was a small citadel on the west side of mount Vertiskos, within the limits of ancient Mygdonia with Balsatia. The city was occupied in the Hellenistic period and excavations revealed many public and private buildings. Soil samples from various sections of the excavation were taken and revealed plant remains such as cereals (emmer, einkorn, barley and millet), legumes (lentils) and fruit (figs and grapes). Out of these samples, which were mixed with undomesticated plants and weeds, the most interesting one comes from habitation block 8. This sample contains grape seeds and the excavators have suggested that they may be associated with limited wine production. Modern vine cultivating areas suggest that this would have been possible even in the Hellenistic period. Nonetheless, the evidence is very limited and we cannot talk about extensive viniculture.

Archaeological evidence from Hellenistic farmhouses in Pieria is equally interesting. Three of these houses are located near Platamonas (in the sites Kompoloi, Douvari and Platania, Krania is located very close to the sea and two other farmhouses are more remote, since they are located at the sites of Phila and Leivithra respectively (fig. 8)). All of these farmhouses were residential with the exception of Krania, which may have been used as a restaurant and gathering place. Platania was the largest one measuring 2,400 square meters.

The estate at Platania was quite extensive and different agricultural practices were taking place. The building consisted of several rooms, which were built around a central

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223 Margariti 2015.
224 However, if we add the external areas as well, the size of the estate was 5,000 square meters of more (Margariti 2015, 337).
courtyard with stoas. The farmhouse at Kompoloi was built on a similar plan. A large storeroom is located on the NE corner of the house and excavations in the area have revealed numerous pithoi, most of which were broken and reused already from antiquity. In the courtyard, which was the centre of the domestic activities, there was a pottery kiln and a tower. However, unlike the farmhouse at Kompoloi where the tower was assimilated into the building, the tower at Platania is a free-standing, independent structure that stands in the centre of the courtyard. Activities were not restricted on this part of the house only. Several roofed stoas, enclosures and corridors have also been excavated and abundant pottery has been found within them.225

A diverse group of plants and archaeobotanical remains has been found at Platania such as emmer, einkorn, oat and rye in terms of cereals. Lentils were the only legumes, while olives, grapes, figs, cherries and hazelnuts were also present. Oat and rye are not found in considerable quantities and it is plausible to suggest that they were brought into the farmhouse as weeds attached to other crops, rather than foodstuff. An area with threshing floor at the south of the farmhouse was probably the area where the wheat was sieved, milled and processed. Crop processing may have also taken place in the east wing of the farmhouse as suggested by a big amount of grape seeds dispersed on the floor. These seeds are probably the by-products of wine-making. Finally, olive oil production was also practised in the farmhouse at Platania. Olive pits have been discovered on the floors, they courtyards as well as in the area of the kiln and it is plausible to suggest that these were the residues of olive oil production. Agriculture was practice at different levels at the site at Platania and the amount

225 Margariti 2015, 337-8, fig. 12.3.
of the seeds excavated suggests that the production of wine and olive was of considerable scale.\textsuperscript{226}

At the farmhouse at Kompoloi, on the other hand, production of wine was extensive. This farmhouse was considerably smaller than Platania (1,350 square meters), but their close proximity suggests that they were connected somehow. It is likely that Kompoloi was part of the largest estate at Platania. The farmhouse consisted of the living quarters and a storage area, where thousands of grape seeds have been discovered.\textsuperscript{227} The large quantities of grape seeds are representative of the late stages of wine production, suggesting that the initial processing of the grapes was probably taking place outside the house. Other archaeobotanical remains that were discovered at the farmhouse include wheat, lentils and fig seeds found around a hearth located in the patio of the living quarters, signifying a certain extent of food preparation outside of the rooms of the house. However, crop processing was not practised at Kompoloi.\textsuperscript{228} Douvari was one of the smallest farmhouses in the area and was probably part of the largest estate of Kompoloi. Plant remains consisted of grape seeds that were found in a pithos. However, it is highly unlikely that the wine was actually prepared in the farmhouse.\textsuperscript{229} Finally, the urban building at Krania (the ancient city of Herakleion) was probably a place of gathering, offering food and drink to the visitors of the harbour.\textsuperscript{230} The use of the building as a public meeting place rather than a private dwelling in the Hellenistic period is evidenced by the presence of a big variety of plant remains – from wheat to oats, and rye to olives and figs. The samples from the floor of the building are essentially thrown away foods from various activities, such as processing, food preparation and possibly

\textsuperscript{226} Margariti 2015.
\textsuperscript{227} Margariti 2015, 336-7, fig. 12.2.
\textsuperscript{228} Margariti and Jones 2006.
\textsuperscript{229} Margariti and Jones 2006.
\textsuperscript{230} Margariti 2015, 339-41, fig. 12.4.
consumption. Raw remains in Building Δ of the complex, on the other hand, suggest that this space was intended for the preparation of food.\textsuperscript{231}

3.5. Discussion

Through this brief presentation of the main sites with evidence for agricultural production in Macedonia from prehistory to Roman times, several interesting patterns have emerged. Overall, the main crops represented at each site do not change significantly over time. It appears that people always relied on wheat on their bread and legumes for their protein intake. However, as we advance over time, we observe that agricultural practices become more complex. And while most these agricultural activities are practised on a limited scale, they tend to involve an increasing number of people over time.

The main crops of the Neolithic period are wheats, with einkorn being quite popular. Barley is well represented as well and legumes (mostly lentils) are also present in the diet of the prehistoric man. However, each of the Neolithic sites we have discussed is also distinct in terms of the combination of fruit, nuts and crop species they cultivate or choose to consume from the wild. While wheat was probably used for the production of bread and legumes and fruit were also consumed by humans, it is very likely that barley was animal food. What is even more surprising is the limited appearance of rye in Neolithic sites. Settlements like Nea Nikomedeia, Thermi and Stavroupoli cultivated limited quantities of wheats, which were often enough for the needs of the settlers. Stone grinders and other tools suggest that the processing of wheat carried in a limited scale. Although the degree to which a crop is being processed is not always indicative of consumption, it can be argued that the processing

\textsuperscript{231} Margariti 2015.
remains of wheat, actually suggest that the end product was going to be consumed by humans. The lengthy and time-consuming process of wheat processing is avoided when these are intended to be used as fodder. When it comes to the other crops, the evidence is inconclusive. Although barley grain was most likely used as fodder in the majority of the Neolithic sites we have discussed here, other uses cannot be precluded. It is very likely that stored barley seeds at House 1 at Dikili Tash were intended for use as food.

Although the most of the fruit and nuts found in the Neolithic sites of Macedonia could have been consumed by humans or animals, the presence of undomesticated fruit such as figs and grapes is somewhat problematic. Wild fruit at Dispilio were probably intended for immediate human consumption, since there is no evidence that they were stored in the settlement. However, remains of grapes at Dikili Tash and Makriyalos narrate a different story. The large quantity of grape remains at Dikili Tash suggests that they were used for the production of wine. Wine is linked to feasting and various ceremonial activities in prehistoric societies and is really important in later exchange networks. Its consumption may be linked with the appearance of clay jugs and cups in Bronze Age Dikili Tash. However, just like Makriyalos and unlike the evidence from the Bronze Age and the Hellenistic period, wine production at Dikili Tash was unspecialised and occurred at the household level. The evidence from Dikili Tash (and Makriyalos to a certain extent) advocates that during the Neolithic small patches of woodland surrounding the settlement may have been intensively cultivated leading to the established of an early type of viniculture.

While ethnoarchaeology suggests that crop fields were definitely time-consuming for the farming societies of Northern Greece, the relationship of the Neolithic man with certain

233 Valamoti 2015, 42.
234 Valamoti 2015, 45.
parts of the wild landscape is still a bit uncertain. Wild trees could have needed less tending compared to fields and crops. In any case, wild trees and vines were reminiscent of a-not-so-distant past where hunting and gathering were the main sources of food. As a result, wild or semi-wild vines and trees around the Neolithic settlements at Dikili Tash and Makriyalos not only provided food but also united the household under common agricultural activities. This co-habitation of wild and cultivated species was, therefore, indicative of more complex cultural activities.

Moving to the Bronze Age, we observe a gradual transition from semi-permanent to permanent farming societies. In this period, agriculture is important for the sustainability of the community. This is evidenced by the large storage spaces at Assiros Toumba, Archontiko and Megali Toumba. With the exception of Dikili Tash and perhaps Giannitsa where evidence for organised storage has been discovered, Neolithic agricultural communities did not put emphasis on storage (at least as far as the archaeological evidence suggests). The transition to the Bronze Age was accompanied by changes in the landscape and the exploitation of the land as well. Toumba sites are preferred for the creation of settlements, due to their natural defensive characteristics. In this period, wheat is cultivated in a more substantial scale, since part of it will end up in storage for subsistence purposes. At the same time, people experiment with legumes in the diet. The prominence of lentils in Bronze Age sites could be linked to soil exhaustion, or the production of more crops resulting from a population increase.\textsuperscript{235} It has also been connected to a nucleation that occurred around the area of Drama in the early Bronze period that led to changes in agricultural practices.\textsuperscript{236} Last but not least, agricultural

\textsuperscript{235} Renfrew 1972, 281.
\textsuperscript{236} Valamoti 2004, 115.
communities of this period are keener to experiment with wine production as evidence by the grape remains at Megali Toumba.

From the Classical period onwards, it seems that agriculture in Macedonia is centred on the exploitation of the grapes and the olive trees. However, some notable and interesting exceptions prove that people were also interested in less common and exotic products such as sesame seeds and pine nuts, as evidenced by the excavation at the Governor’s Square in Thessaloniki. However, the presence of beans, sesame seeds and pine remains in a public building is not a common occurrence.

To what extent can we link agricultural practices in post-Bronze Age Macedonia with the political events of this period? This is a question that is difficult to answer, however, it is safe to assume that during period of stability such as the reigns of Alexander I and Philip II, the exploitation of the land could have potentially been profitable. In periods of political turbulence and upheaval, on the other hand, subsistence through the land would have been almost necessary. In the Hellenistic period, this type of subsistence was promoted by the city as it is evidenced by the archaeological remains at Ossa as well as smaller civic entities, represented by the farmhouses in Pieria. Both these arrangements – the city providing for its citizens and the smaller farming communities being depended on the largest ones through a complex web of interactions – show intensification of production at a regional level.

The large quantities of grape remains found at the site of Kompoloi, in combination with extensive storage facilities, are indicative of large-scale viticulture, which would not have been possible in previous periods, perhaps due to the lack of social complexity. In the Hellenistic period in particular, we see a shift from generalised agricultural practices to focusing on a particular resource (or a few resources) such as the vine and the olive. Still, smaller cities would have needed to produce a certain amount of agricultural products for
subsistence, but this was not always a requirement. Extensive production of olive oil and wine at a regional level – either through the farming houses or larger agricultural activities – resulted in a distribution in local markets as well as trade. However, it is always important to remember that geographical, political or social conditions may not always be favourable and as a result, the possibility for creating positive grounds for expansion and profit through agriculture was not always present.
CHAPTER 4

Conclusions

4.1. Agriculture in Macedonia – a diachronic glimpse

Almost 12,000 years ago, agriculture was the main reason behind the so-called ‘Neolithic revolution’. Traditional hunger and gatherer societies gradually moved to permanent settlements and sought stable sources of food. This revolution led to the creation of cities and the growth of important civilisations. Animals were domesticated and farmed in order to meet the constant demand for new and diverse food supplies. While many theories have been proposed, there is not really a single reason that made people pursue farming in various parts of the world. For instance, in the Near East, it was climatic changes that brought favourable conditions for plants such as wild cereals. In East Asia, the constant demand for food resources may have forced indigenous populations to be creative and seek their own solutions through their land.

In this dissertation, we have managed to gather information for agricultural practices in Macedonia from the prehistoric period to Roman times. Recent excavations and archaeobotanical studies in the area have enforced our knowledge of crop and plant exploitation in Macedonia diachronically. The predominance of wheats, the importance of legumes, the significant contribution of fruit and a range of animal exploitation strategies, can provide valuable insight into the agricultural practices of the people of Macedonia already from prehistory. While agricultural practices were constantly evolved, we have managed to show that the people of Macedonia relied on the same products for their diet diachronically. As such, wheat had a central place in their table and so did lentils, other legumes and pulses.
The nutritional values of the different categories of plants whose seeds and fruits were
cultivated and were used for the preparation of food in Macedonia were important. Cereals
were the main source of carbohydrates, pulses supplemented or substituted protein when it
was not readily available and fruit were a major source of vitamins and sweetness.

As time passed, and new tools and technologies were introduced, Macedonians were
able to process olives and grapes more effectively. This transition, which started from the
transition from hunting and gathering to permanent settlements based on agriculture, was
long and required a lot of experimentation, as undoubtedly archaeobotanical remains
suggest. However, at the end of this journey, the people of Macedonia managed to
domesticate all these plants that were important to their diet and even started investigating
new ways of exploiting them.

4.2. How has agriculture changed and what can we learn from these changes?

Our entire civilisation is based on agriculture for nutrition and sustainability and it is
probably one of the reasons that has contributed to the stability of the Holocene climate.
However, this stability is frail and could easily come to an end as we enter a new and uncertain
climatic period. Nonetheless, given our diachronic knowledge of crops and practices, we
might as well be able to survive a severe climate change, similar to that of the Palaeolithic.

If we need to keep one thing from past agricultural practices is that ancient species
such as wheat and legumes have endured the test of time and have performed really well in
a period of relative climatic stability. The ancient Macedonians (along with other civilisations)
had to adapt their crop production for optimal results and better preservation. Another key
aspect is seasonality. Ancient civilisations did not have the technological means to speed up
the cultivation process or produce at a mass scale throughout the year. For this reason, wheat
was cultivated at a small scale during its optimal season and was subsequently stored to serve the needs of the household or the community out of season.

Seasonal agriculture is still occurring in many parts of rural Greece and Macedonia is no exception.\textsuperscript{237} If you ask your parents or their grandparents how they used to get their foods a few decades ago, the answers will definitely surprise you. This is mainly because nowadays we rarely have the time to bake our own bread or cultivate our own legumes and fruit. Mass production has replaced small scale agricultural practices, which, however, continue to exist in the smaller communities of rural Greece.

With over 7.3 billion people in the world and an expected population growth of over a billion in the next decade, it is not surprising that mass agricultural production has replaced regional agricultural practices – these are a lot of people to feed after all.\textsuperscript{238} However, with numbers comes responsibility and many scientists are already looking into ways to provide safe and nutritious food to the population without compromising the quality of agriculture. Again, we can look into the recent past. In Macedonia, over 200 years ago or so, most of the population lived in farms or small agricultural communities and produced their own food. Unfortunately, in modern societies worldwide, most people have moved to the large urban centres and only 2% of the population actually produces food.\textsuperscript{239} Admittedly this is a large change. In some cases, this food is distributed through the local markets and reaches a wider audience.

However, we should not be pessimistic. Farmers nowadays use advance technology to produce more food for a growing world. Studies have shown that in the 2000s each farmer

\textsuperscript{238} Murphy 2007, 280.
\textsuperscript{239} Murphy 2007, 280.
corresponded to 155 people, whereas in the 1930s this number was eliminated to 19 people. Motorised equipment has replaced animals and better and more reliable technology has given farmers the motivation to improve. Moreover, modern technology requires less labour and as a matter of fact, a small number of people are now involved in direct agricultural activities in Northern Greece.

The way in which farm animals are raised has also changed through the ages. Though domestication was a big step that led from hunting and gathering to agricultural societies, animals are not used into farming to the same extent as they used to. Moreover, farmers are more considerate of their animals, even if they are raising for wool, meat and milk. Making the animals live in a comfortable environment is really important because this contributes to their health and quality and quantity of their milk.

Last but not least, crop production has improved considerably in recent years. Seed technology has changed the quality of many species over the years and has made crops less vulnerable to climatic conditions. In the past, crops that were destroyed due to bad weather conditions were a common occurrence, but today scientist can change the durability of the crop by genetically modifying their seeds in the first place. Something similar – minus the technology – occurred already from the Neolithic. Farmers had to adapt their crops to the natural environment and the climatic conditions of this region; however, through a lengthy procedure of trial and error crops were gradually domesticated and this lead to the creation of new species and the establishment of common, old ones.

Diachronically, farmers have been trying to make the most of their resources. Modern farmers have more opportunities to partake in sustainable agricultural practices such as conservation and moderation. The evidence we have discussed in this dissertation suggests that moderation and sustainable agricultural and farming practices were the secrets behind
the prehistoric and historical communities of Macedonia. More importantly, an important aspect of agriculture in Macedonia that remains the same today as it did thousands of years ago, is that small, independent farms are still owned by families or communities, whose purposes they continually serve.240

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Figure 1: Modern map of the geographical region of Macedon in northern Greece (© Wikipedia).
Figure 2: Map of the Macedonian kingdom from 334 to 323 BC (Ginouves 1993).
Figure 3. Evolution of the major cereal crops (Murphy 2007).
Figure 4: Structures of the major domesticated wheats. The structure of ears (A) and grains (B) of the three major historic cultivated wheats; Einkorn (A), emmer (B), and spelt wheats (C) [Murphy 2007].
Figure 5: Grape pressings (a) and malformed pips (b) from Dikili Tash, House 1 (Valamoti 2015).
Figure 6: Aerial photograph of the excavation site of Megali Toumba in the heart of the city of Thessaloniki (© Aristotle University of Thessaloniki).
Figure 7: Miniature iron cart from an archaic tomb at Sindos (Ginouves 1993).

Figure 8: Map of southern Pieria with the sites of Hellenistic farmhouses (Margariti 2015).