Medieval Agricultural Practice and Exchange at Arpa Village, Armenia

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Abstract

The Arpa Village site was a major settlement in the Medieval Age in Armenia, a period which has sparse research. This project analyzes the archaeobotanical remains (carbonized seeds and plant parts) of several loci of this settlement to understand further the agricultural, economic, and wild plant remains. These remains allow for comparison and connection to the lifestyles of the people who lived in this area. The Arpa Village was a bustling village as well as along the trade route of the Silk Road throughout the late Middle Ages. Past archaeobotanical research of this region of Armenia has been done contextualizing the palaeobotanical remains from a caravanserai site as well as a nearby cave, but more research must be fulfilled in various contexts of the geographical location to compare the results for further conclusion. This study broadens our understanding of agriculture and trade within Armenia along the Silk Road trade network.

Archaeobotanical remains were identified to plant taxa (family, genus, or species level when possible), the data was categorized for analysis of the remains within the samples. Wheat (*Triticum aestivum/durum*) was the most encountered cultivated taxa followed by barley (*Hordeum vulgare*) and millet (*Panicum* sp./*Setaria* sp.). Other cultivated seeds found included various legumes (Fabaceae), grape (*Vitis vinifera*), rice (*Oryza sativa*), pine nut (*Pinus* sp.), peach (*Prunus persica*), and pomegranate (*Punica granatum*). Many of these seeds indicate various forms of agriculture and seasonality and suggest the possibility that the Arpa village was an economic trading center. The wild and weedy taxa consisted of over 25 families and 50 species, but the *Rumex*/*Carex*/*Polygonum* and Chenopodiaceae/*Chenopodium* sp. categories occurred in the greatest number of samples as well as consisted of the highest prevalence of the wild and weedy seeds overall. The diversity of the wild and weedy seeds leads to the findings that the landscape and geography of Arpa was quite diverse during this era. The data gathered

from the few Armenian archaeobotanical studies can be compared to better contextualize and create a better image of the agricultural, economic, and lifestyle practices that occurred in the Middle Ages of Armenia.

Introduction

There are limited analyses of archaeobotanical remains from the medieval period that exist in the region of Armenia (Smith et. al. 2014), which is why the contributions of the Arpa Village site are making such an important impact. This project will both qualitatively and quantitatively analyze the agricultural archaeobotanical remains and uncultivated and/or wild plant types of the Arpa Village region during the Middle Ages. Excavations were started by Dr. Kathryn Franklin (School of Historical Studies, University of London, UK) in 2016 to document medieval life on the Silk Road in Armenia. Dr. Franklin excavated the village site in a conjoined large-scale project with many surrounding Armenian sites. Dr. Franklin and Armenian researcher, Dr. Astghik Babajanyan (Department of the Medieval Archaeology of Armenia, Institute of Archaeology and Ethnography of the Armenian National Academy of Sciences, Republic of Armenia), began the Vayots Dzor Silk Road Survey (VDSRS) project to study and preserve these Silk Road landscapes of Armenia (Babajanyan 2021). The samples were sent to the lab of Dr. Joy McCorriston (Department of Anthropology, The Ohio State University) from which this project developed. In 2023, Sydney Hunter, a PhD candidate of Dr. McCorriston's lab, was a part of another excavation at the Arpa Village site. Sydney brought these samples back to be sorted further, and two of them from the 2023 excavation were used for this study. My research contributes to an effort to discover more about the Middle Age archaeology in Armenia. This project continues the efforts initiated by the Project for Medieval Archaeology of the South Caucus, also known as MASC, where Franklin and Babajanyan were contributing researchers working for an Armenian-American collaborative. This information of the Arpa village site focuses on determining and specifying the agricultural and economic context of the village in its prime during the peak of Silk Road travel.

Trading within Arpa and between other villages and regions along this route potentially permits dozens of different types of seeds to be introduced in the archaeobotanical record. What is found within these samples, whether a cultivated type or not, has the potential to suggest that certain items/goods/seeds were traded or moved throughout this village or possibly tells us the types of agricultural context and landscape patterns. This analysis can be used further to infer lifestyles and cultures that existed in the village and/or region.

Background

The Arpa settlement lies on the southern bank of the Arpa River, a tributary to the river Araxes, within the modern-day village, Areni, Vayots Dzor providence, Armenia. According to 13th century historical sources, this site was a major settlement in the medieval period consisting of an administrative center, standing walls and room blocks, as well as a reconstructed church from this same time. The Arpa village site was regionally ruled over by the Orbelian dynasty who constructed the main village, though there is evidence of habitation of this land prior to the 13th century. The Orbelian dynasty were vassals to the Ilkhanate Mongols during the late medieval period (13th century to 15th century AD) in Armenia. The Mongols completely dominated this region of Armenia during this period, controlling much of the trade and economic resources.

This settlement was a site along the Silk Road, through which large masses of people and caravans traveled through. The Silk Road designates a system of trade routes connecting China all the way to the Mediterranean Sea and the Middle East. This was one of the most important exchange systems throughout all of history, and it led to the creation of our world trading systems (Abu-Lughod 1989). A caravanserai site within the Caucus Mountains, Arai-Bazarjugh, was excavated by Franklin in 2011, and the work of Anna Berlekamp (now a graduate student in

the Department of Near Eastern Languages and Civilizations, University of Chicago) analyzed this (Berlekamp 2016). The caravanserai site was a road inn along the trade routes in the medieval period in which people would stay safe during their travels (Franklin 2014). My project is comparable to the remains of the Arpa village site. Both sites found along the Silk Road in similar geographical regions and from medieval times. The Arpa village analysis will provide a foundation for comparing these medieval Armenian sites. Arpa was centrally located along trade routes and served to connect the north/south route and the east/west route, making it a very significant point. The Orbelian dynasty maintained great success throughout their rule over the providence, building public buildings, production facilities, churches, educational institutions, etc. Their control over the trade and agriculture of this land helped them prosper until invasions forced them to migrate to Georgia (Franklin & Babajanyan 2018).

Currently, Arpa, now known as Areni, experiences a dry climate with little rainfall year-round. Winters are cool, but the warm-to-hot spring and summer seasons make up for most of the year. The vegetation surrounding Arpa today varies from semidesert to forest-steppe, but various evidence reports that this region experienced more rainfall and a period of wetlands (Gyulai 2010).

The site consisted of a 10-ha area containing the nine loci from which this project's samples were obtained. The loci were from 13-14th century occupational contexts of ordinary dwellings during the late Middle Ages during the time of the Orbelians' rule over the region. The first seven samples come from the excavation of 2016, while two of them come from the 2023 excavation. Four of the nine samples were taken from tonirs, more commonly known as ovens in modern day. The other five were taken from a pit, a floor, a collapse, the fill of a basin associated with tonir context, and a vessel, or wine jug. These samples were taken from three sondages,

AS2, AS4, and AS6, which were all medieval dwellings. Although not individually dated, these samples of plant remains are roughly contemporary and serve to document depositional accumulations in a medieval village.

Figure 1: view from the south of the AS2 occupational space

Figure 2: general view of the AS4 occupational space

Figure 3: general view of the AS6 occupational space

Photos courtesy of Kathryn Franklin and Sydney Hunter.

The large-scale excavation project aims to learn more about the archaeology of Armenia during the Middle Ages, but the Arpa excavation specifically investigated how the movement of goods through trade was experienced by those stationary people within the village. An analysis of plant remains contributes an archaeobotanical perspective to these project goals. Arpa was a

lively settlement in the 13th century (Shahnazaryan 2014), thus becoming an ideal location to address the goals of these questions.

I will reconstruct the crops and land usage from the archaeobotanical remains. This reconstruction will support an interpretation of agricultural and trading/economic practices. The Arpa village site invokes the questions of how the macrobotanical remains—seeds, weeds, and various plants— will relate to remains from other sites previously analyzed.

The settlement of Arpa is 0.5km northeast to the center of the modern village of Areni, in which archaeobotanical remains have been recovered from a cave. The Areni cave, site situated within the eastern region of the Areni village, is a nearby Chalcolithic and Medieval occupational site that began excavation in 2007 (Smith et al. 2014). The Areni site has remains spanning from the 4th to 18th century of the Medieval period, providing some evidence and comparable analyses to the Arpa village site (to which the Areni cave site may have been related). Though research seldom exists for medieval archaeobotanical comparisons across a medieval landscape, the Areni site provides a robust foundation for geographically and climatically comparable results and ultimately, a landscape perspective on medieval Armenia.

Methods and Materials

Seven samples came from the 2016 excavation of the Arpa village site. They were collected in Hubco 10x17 sample bags making their approximate volume 1L before flotation. The samples were further isolated using a flotation method to gather the most useful fragments within the soil. The samples were bucket floated through a 2mm mesh screen (Franklin 2016). This project utilized standard archaeobotanical methods to process and identify the samples (Champion & Fuller 2018). The last two samples analyzed were those from the 2023 excavation of the settlement. Though several more samples were obtained from the 2023 excavation, time

did not allow for us to complete the full sorting and identifications of them, so the samples estimated to provide the highest probability of identifiable remains were sorted. We estimated which samples to select after sorting and identification of the first seven samples. The samples that showed the highest prevalence of cultivated seeds within the first seven samples were those with tonir context, so the archaeological context of the samples was used to identify two of the newer samples that were of tonir context as well. One of the samples chosen was a soil sample taken from the middle of the tonir while another was a soil sample taken from the top of a different tonir to attempt to find a wider array of seeds and content. These samples were 7L before flotation. All nine samples ranged from 30ml-170ml in volume after flotation methods. The samples were each sieved into >2mm, >1mm, >500 μm, >250μm, and <250μm fractions. Each fraction was thereafter sorted to remove identifiable material from charcoal and non-diagnostic fragments. Sub-sampling methods were utilized so that I sorted incrementally from the largest size group (2mm) to the smallest (<250μm) (Adams 2000). This incremental sorting uses the method of sorting fractions of the remains until no new taxa are identified within sequential fractions, thus assuring representation of abundant taxa.

Table 1: Sample Contexts

Site: ARPA		
Sample Number/ Locus	**Year Excavated**	**Description**
AS2.8	2016	collapse
AS2.10	2016	pit
AS2.13.1	2016	tonir (oven) (>90% cattle dung)
AS2.13.2	2016	tonir (oven)
AS2.18	2016	vessel (wine jug)
AS4.3	2016	fill of tonir-associated basin
AS4.9	2016	floor
AS6.22	2023	top of tonir 20- soil sample
AS6.37	2023	tonir 31 contents middle soil

The samples were sorted by me and by a fellow undergraduate student, Julia Frost, with identification guided by Dr. McCorriston and Sydney. Remains that were thought to be identifiable, whether seeds, plant fragments, charcoal, carbonized/charred material, mineralized material, bone, shells, glassy nodules, and even dung, were counted and recorded. Most of these remains were carbonized, or charred, due to the common usage of fire in anthropogenic activities as well as possibilities of cooking or fuel (Zohary et. al. 2012). Remains that consist of more robust materials, such as the cereal grains and nut/fruit seeds, are also more commonly collected as carbonized materials (Van der Veen 2007). The remains were further analyzed to determine what nomenclature could be written for identification, leaving some remains as unidentifiable or unknown; these are not included within this report. Though all the types of remains thought to be identifiable were recorded, only the carbonized/charred materials, seeds, and plant fragments

were included in this specific report, based on their potential roles in interpreting agriculture, land usage, and trade practices during this era in Armenia. Once the samples were identified to our full expertise, the data was then organized for quantification (Table 2) and statistical analysis. This study will use exploratory data analysis, also known as descriptive statistics, to characterize the results. Exploratory data analysis contains several different forms of statistics that range from basic data tables to multivariate statistics, which allow for the observation of differences within and between the samples and their loci contexts (Charles et. al. 2009). The use of this form of statistical analysis is to identify systematic patterns and relations of variables without the use of prior expectations as hypothesis/significance testing would entail (TIBCO Software Inc. 2020). The Arpa site will be quantitatively analyzed using varying forms of percentages as well as ubiquity, which is explained later in this report. The conclusions made from these remains will be compared to other research analyses within the large-scale MASC project.

Analysis

There will be several exploratory data analyses explained within this analysis to familiarize the statistical analyses used. Analyses will rely on classification, categorization, and percentages in various contexts, as well as ubiquity.

Four categories were used to further analyze the taxa: wild/weedy types, cereals, perennial fruits/nuts, and pulses. These categories have been used in previous analyses (Hunter et. al. manuscript in review.), so my use will help create a regional perspective with ready comparison across sites and analyses. The three latter categories are all considered cultivated seeds that rely on certain agricultural practices for production. Each assemblage's composition was determined and classed as categorical percentages.

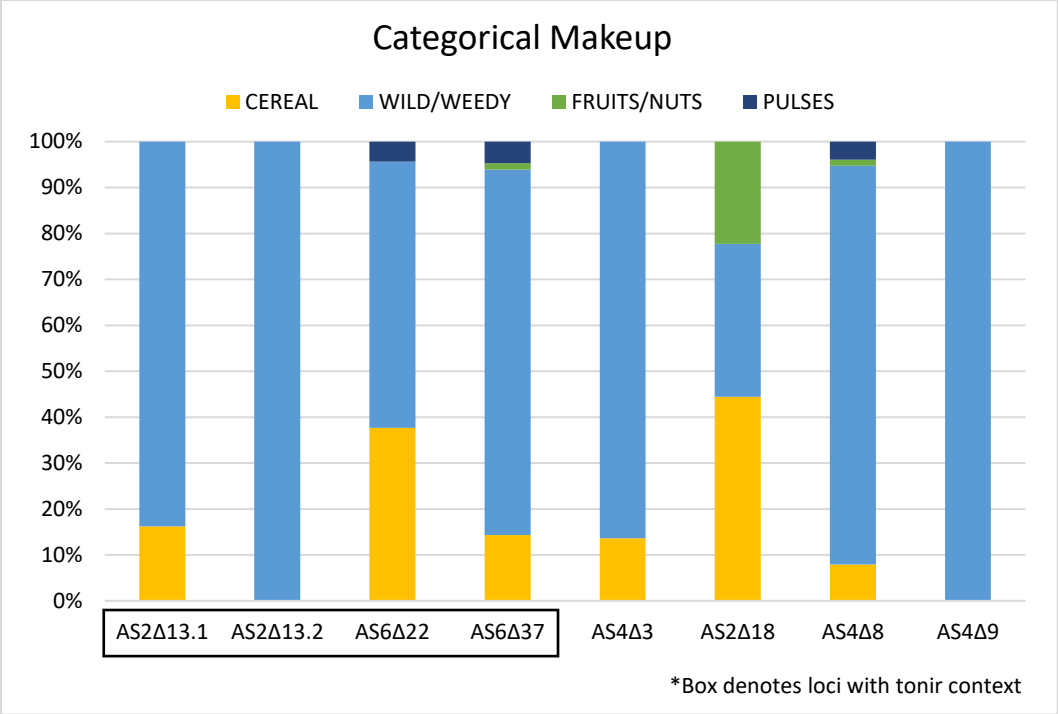

Figure 4: showing the percentage makeup of the loci with categorical remains

Figure 4, wild/weedy seeds make up the majority of the total seed count throughout all the samples as well as make up most of each individual sample, with the exception of AS2.18 which shows the greatest ratio of cereals. These samples' composition was also organized by family classes. These classes show how important certain types of taxa and families are within each sample and the total seed count. Analysis of the seeds was also done to determine ubiquity of the individual taxa across all nine assemblages. The ubiquity controls for inherent interdependencies that come with percentage analysis (Diehl 2017). In percentage analysis, the increase of one taxon in turn decreases another, therefore also diminishing the value of other taxa in an assemblage.

Ubiquity of archaeobotanical remains in this context allows for each taxon to carry value, based not on seed count, but by comparison to overall prevalence in the samples (Popper 1988).

The total count of seeds throughout all the samples can skew the data towards misleading trends. This can be demonstrated through the comparison between two wild/weedy seed types, *Rumex sp.* and Malvaceae. *Rumex sp.* differentiated in analysis from the taxon *Rumex/Carex/Polygonum*) has a total count of 49 overall, but it only appears in one of the samples, whereas Malvaceae has a total seed count of 8 but appears in 5 of the 9 total number of samples. Ubiquity can indicate how great the prevalence and/or preservation of certain taxa are within variable loci and different parts of the assemblage. This quantification can also suggest whether certain taxa are specific to one context of loci and what this means for its agricultural, economic, and cultural usage. Figure 5 shows the taxa with a ubiquity greater than 11% or appearing in more than one sample.

The two taxa with the greatest ubiquity, *Chenopodium sp./*Chenopodiaceae and *Carex/Rumex/Polygonum*, are discussed further in this report. Boraginaceae and *Buglossoides* sp. appear in 5 and 4 of the samples, respectively. *Buglossoides* sp. is in the Boraginaceae family and suggests a humid steppe vegetation (Zardaryan & Hovsepyan 2017). The Boraginaceae family shows variability in the type of vegetation and landscape that the genera and species thrive in. Bedstraw (*Galium* sp.) and mallows (*Malvaceae*) were both present in over half of the samples and are common weeds found in archaeological sites in Armenia (Zardaryan & Hovsepyan 2017). They are also common weeds in the region in modern day Armenia.

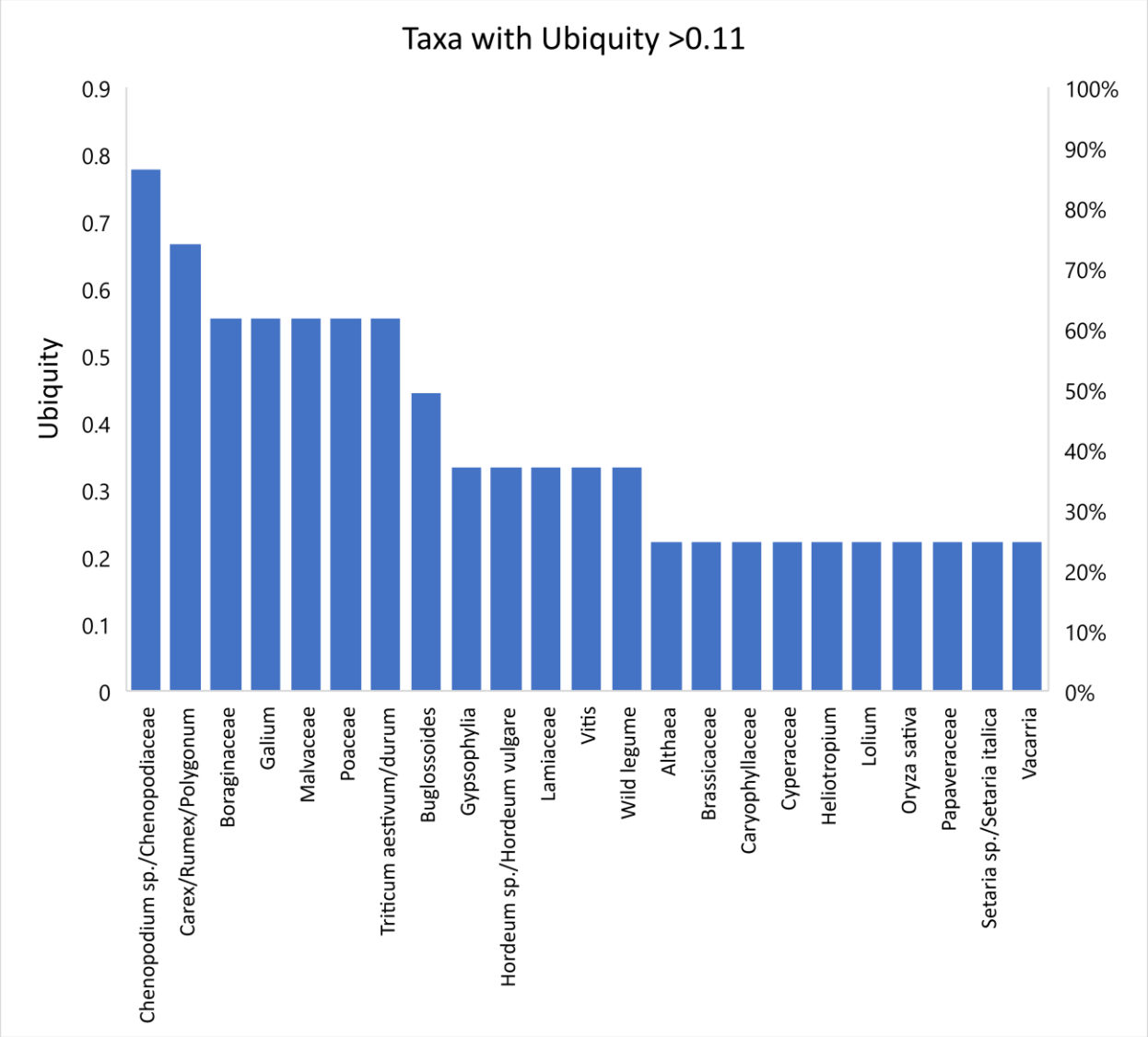

Figure 5: shows the taxa with a ubiquity >0.11 (appearing in >1 sample)

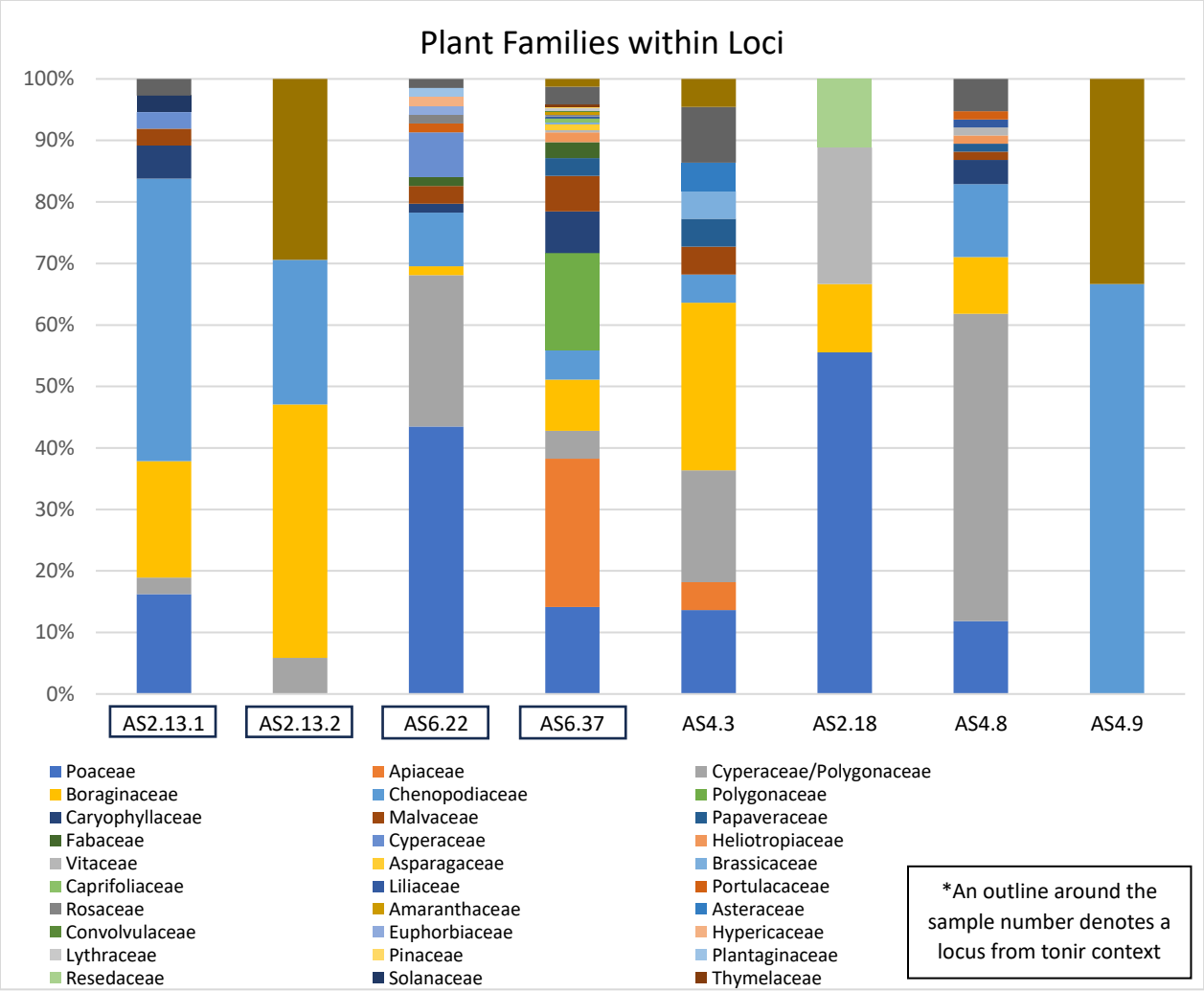

Figure 6: shows the percentage makeup of families within the loci

Figure 6 shows us that Chenopodiaceae, Cyperaceae/Polygonaceae, and Poaceae were the most common families found throughout all samples. The most common seeds of the Poaceae family found in this study were wheat (*Triticum aestivum/durum*) and barley (*Hordeum* sp.). These cereals will be discussed further in depth later. Chenopodiaceae and Cyperaceae/Polygonaceae are both wild/weedy types, and from the latter, one could infer that the landscape was that of a wetland at one point (Li et. al. 2022). Cyperaceae and Polygonaceae are considered as one in this study because they encompass the *Rumex/Carex/Polygonum* group of

seeds which is the most ubiquitous and highest prevalent wild/weedy taxon found (Figure 5; Figure 6). Chenopodiaceae encompasses *Chenopodium* sp. as well as those just determined by family.

Cultivated Types

Cultivated plants refer to those that have been deliberately planted and harvested. Not all are domesticates—domesticates have a mutual dependence relationship with humans for mutual reproduction. Cultivation may include different forms of farming such as tilling or plowing (Helbaek 1959). This is not to be confused with domestication, which includes the changing and evolution of the actual plant (Fuller & Colledge 2008). The process of cultivation is essential to the domestication of plants as well as advancements in agriculture. Proof of cultivation and cultivated seeds provide great evidence in the field of archaeobotany as to what the agricultural context, climate and temperature, land usage, lifestyle, and trading systems were like during this time. Figure 7 shows us the percentages of cultivated taxa of the total cultivated types count with

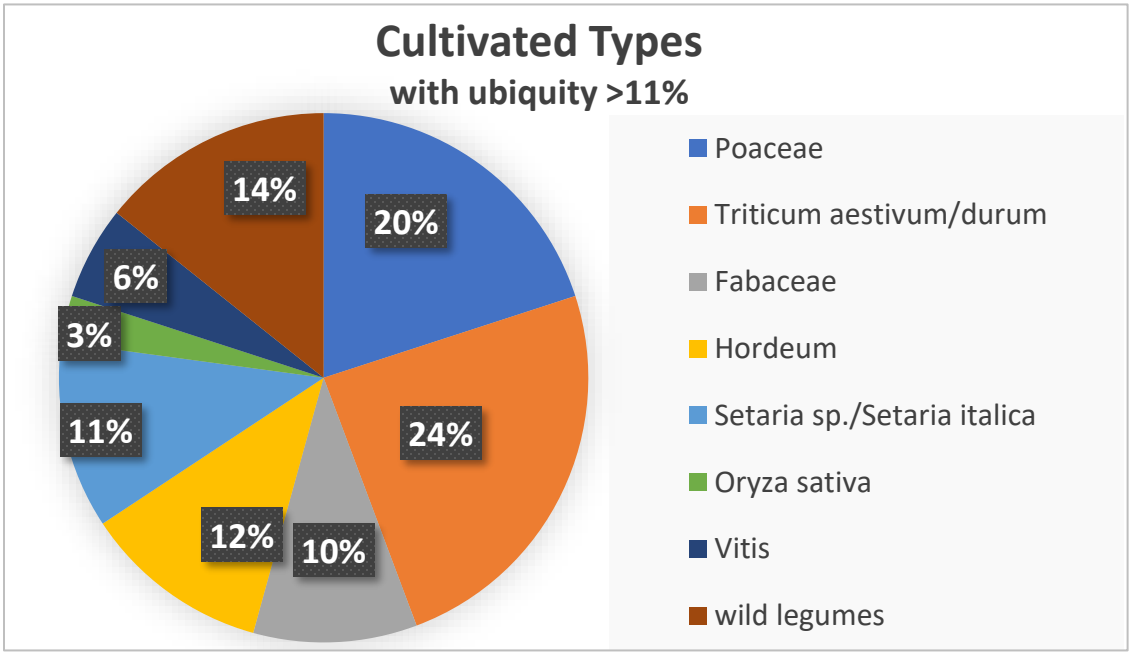

Figure 7: display of the cultivated taxa appearing in >1 sample

a ubiquity >11% or appearing in more than 1 sample. Those that could only be identified by their family name, Poaceae, and wheat (*Triticum aestivum/durum*) were the most ubiquitous cultivated types found. These cereals made up for 70% of the cultivated seeds found as ubiquitous taxa. The high percentage of cereals found could be attributed to four of the nine samples being taken from tonir contexts showing evidence of cooking in these loci. Wild legumes and Fabaceae made up 24% of these ubiquitous taxa but poor preservation limited clear identifications of pulse crops. Many of the other cultivated types occurred in small numbers across the samples. Nonetheless, these few examples of cultivated types also provide indicative factors of various aspects of this settlement during the 13th century.

Cultivated Types: Cereals

The high percentages of Poaceae seen throughout all samples (Figure 6) suggest that these cereals were being used in cooking and were common in the area. The commonality of cereals is suggestive of the wheat, barley, and other cereals being cultivated in this region of Armenia. Nearly all the wheat and barley found throughout samples did not contain any rachis fragments, suggesting that these cereals were already processed once they were present in the occupational site where the remains were collected, or that the contexts (tonirs) did not capture processing by-products. These grains may have been brought into the area by trade, but it is more likely that these grains were grown, harvested, and processed nearby in the region. Previous studies and analysis of a nearby caravanserai site contain archaeological materials suggesting the latter (Franklin 2014).

Present in five of the samples, wheat (*Triticum aestivum/durum,* bread and/or hard wheat) was the most ubiquitous of the cereals. Barley (*Hordeum vulgare*) appeared in three samples. Some cereals were only able to be identified by family, Poaceae, which is present in five samples

as well. Cereal grains were common in the diet during the Middle Ages and were grown in this region (Berlekamp 2016). It was during this time in the medieval period in which wheat became more popular than barley (Dönmez 2006). This shift can be attributed to the increased amount of rainfall that was happening as Europe began to grow wetter and cooler during the 11th century (Gyulai 2010). The increasing rainfall can be seen to run parallel to the increasing ratio of wheat to barley (Miller 1998).

These cereals were mostly found from the loci with tonir contexts, suggesting residues from cooking and/or fuel. Animal dung was commonly used for fueling purposes during this period, so the cereals were most likely used as animal feed and passed into their dung (Miller 1984). The high ubiquity and overall total count of wheat suggests that *Triticum aestivum/durum* was a commonly used crop during this era and supports wheat as easily farmed in this region of Armenia due to the cooler and wetter climate of the medieval period.

Figure 8 displays the total counts of remains per family without attribution to sample size. As seen, Poaceae has the highest count of all total seeds found. Though sample size has not been considered, this family is ubiquitous and appears throughout several samples. Patterns show that the wild/weedy taxa occur throughout all samples, but the high ubiquity is attributed to several different families. The Poaceae family's high count provides value and substance to the cereals found in this settlement.

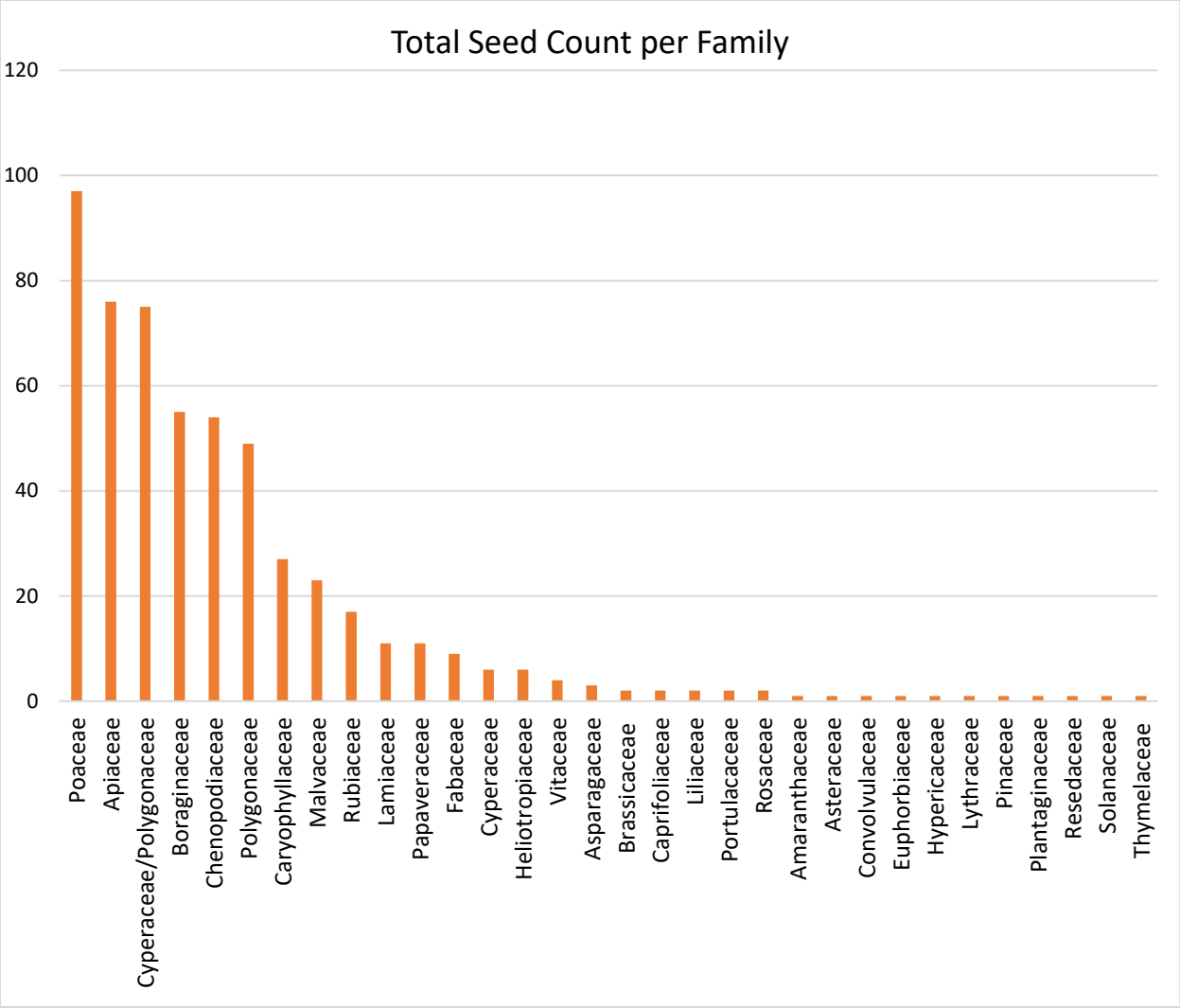

Figure 8: total count of seeds per family

Another cereal, foxtail millet (*Setaria italica*), was present in just two of the samples and at a very low count (Figure 5). Foxtail millet was able to flourish in areas with less precipitation, much like Armenia's current climate patterns, and was considered a staple grain in the central plains region of Asia. Nonetheless, millet agriculture is inconsistent with landscape and climate patterns of this region of Armenia during the Middle Ages but may be evidence of summer crops being cultivated (Fuller & Stevens 2019). The growth of wheat is seen to be more popular during this era than the barley that was declining in growth or the millet that had not reached its peak yet.

The history of rice cultivation within this region of Armenia is scarcely known with just a few previous studies listing archaeobotanical evidence of this crop in the Southern Caucus (Stone 2023). Rice (*Oryza sativa*) was found in two of the loci from the Arpa village site. Since there has been very little evidence of this previously, though low in numbers, this evidence is quite valuable. Domesticated in China, it is evident that the Silk Road played a vital role in the distribution of rice into the Southern Caucus region (Fuller & Stevens 2019). Rice requires a high amount of water to grow, requiring much more labor than other cereals and a wetland landscape to grow in or requiring irrigation system farming (Walshaw 2010). The trade through the Arpa village impacted the local lifestyles by introducing rice into this wetland environment as well as the possibility of introducing new farming techniques of irrigation (Watson 1983). The evidence of rice in Arpa suggests the introduction of diversified farming techniques and methods affected by trade throughout this period.

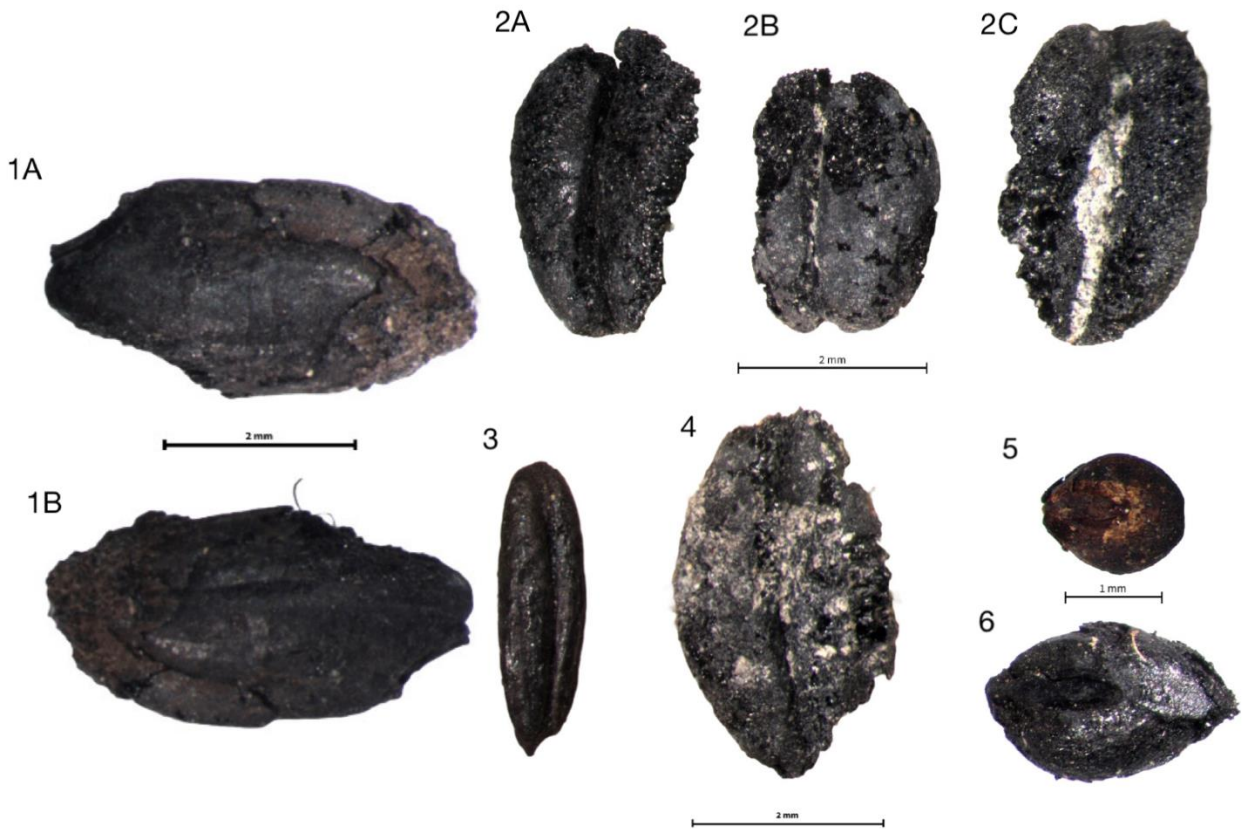

Figure 9: Charred archaeobotanical remains identified as cereals. *Taxonomy and view:* 1- Rice (*Oryza sativa*), (A-dorsal, B-ventral); 2- Wheat (*Triticum aestivum/durum*), (A,B,C- ventral view); 3- Barley (wild *Hordeum*), ventral view; 4- Barley (*Hordeum vulgare*), ventral view; 5,6: Foxtail millet (*Setaria italica*), ventral view

Cultivated Types: Fruits/Nuts

Arboriculture was domesticated between annual crops, such as wheat and barley, and urbanism. It is often thought to play a key role in the reorganization of agriculture and land usage from short-term land usage of cereals to long-term investments for fruit trees and vines, such as

grapes, peaches, and pomegranate as found in these samples (Fuller & Stevens 2019). Perennial crops paralleled the development of settlements and further technological growth.

The perennial crops found in these loci are found in the vessel (wine jug) and the tonirs which led to the assumption that these fruits and nuts were used in cooking and winemaking. The prominent fruit/nut type was grape (*Vitis* sp.) which made up for 3% of the total cultivated seed count (Figure 7) and had a ubiquity of >33% (Figure 5). Previous archaeobotanical studies have found evidence of grape in the Neolithic, meaning that perennial viticulture was already present in Armenia (Hovsepyan & Wilcox 2008). The presence of grapes in this region was most likely used for winemaking purposes, but also may have helped further the arboriculture introduced by trade (Fuller & Stevens 2019). Both vine plants and fruit trees require long-term investment into the crops, which suggests that the people of Arpa were using these methods of farming and gaining more insight from the trade system passing along the Silk Road.

Pomegranate (*Punica granatum*) and peach (*Prunus persica*) were other cultivated types found in small quantities. These two crops are tree crops that were apparent in previous studies of the Southern Caucus but not in large numbers. They may have been introduced through the trade network into the village and helped further the technological advancements of land usage and farming over time in Armenia. These crops are all considered to be orchard produce from permanent (tenured) land holdings.

Figure 10: Peach (*Prunus persica*) from locus AS6.37

Pine nut (*Pinus* sp.) was found in a tonir locus, but in very low quantity and ubiquity. These nuts are not cultivated crops; they are harvested from wild resources (pine trees), either locally or brought in by trade (Hosoya 2011). We cannot determine whether this was imported or gathered

locally, but this could be tested by examining wood charcoal from the site to determine if the pine was grown nearby. Though pine nuts are found in many different climates, the suggested wetland environment of medieval Armenia, would be a great landscape for pine trees to grow (NASA 2024).

Cultivated Types: Pulses

Small, wild legumes were found in a few loci collected from tonirs, but cultivated legumes were seldom found. Because many of the pulses identified were wild, these were most likely just byproducts of grazing or fodder and did not play an important role in the diet (Miller 1984). They may have also been collected alongside other weeds and grasses for fueling purposes. Pulses make up for 24% of the total count of cultivated remains (Figure 7), but 14% is contributed from wild legumes. There were only three taxa that contribute to this category: small, wild legumes, those that could only be identified to Fabaceae, and bitter vetch (*Vicia ervilia*).

Bitter vetch (*Vicia ervilia*) was a common, cultivated crop in the Near and Middle East but has become decreasingly important in the diet and more commonly used to feed livestock (Fern 2024). There was a very low count of this crop, but this may be attributed to the low sample number. It is possible that Arpa did not utilize bitter vetch in the diet as much as other Near and Middle East regions.

Wild/Weedy Types

Figure 11 shows the diversity of the wild/weedy taxa that accounted for >1% of the total seed count found throughout this assemblage. Several of these taxa have a low ubiquity, appearing in just one sample, but their high seed count can be indicative of their importance to the context from which they were found.

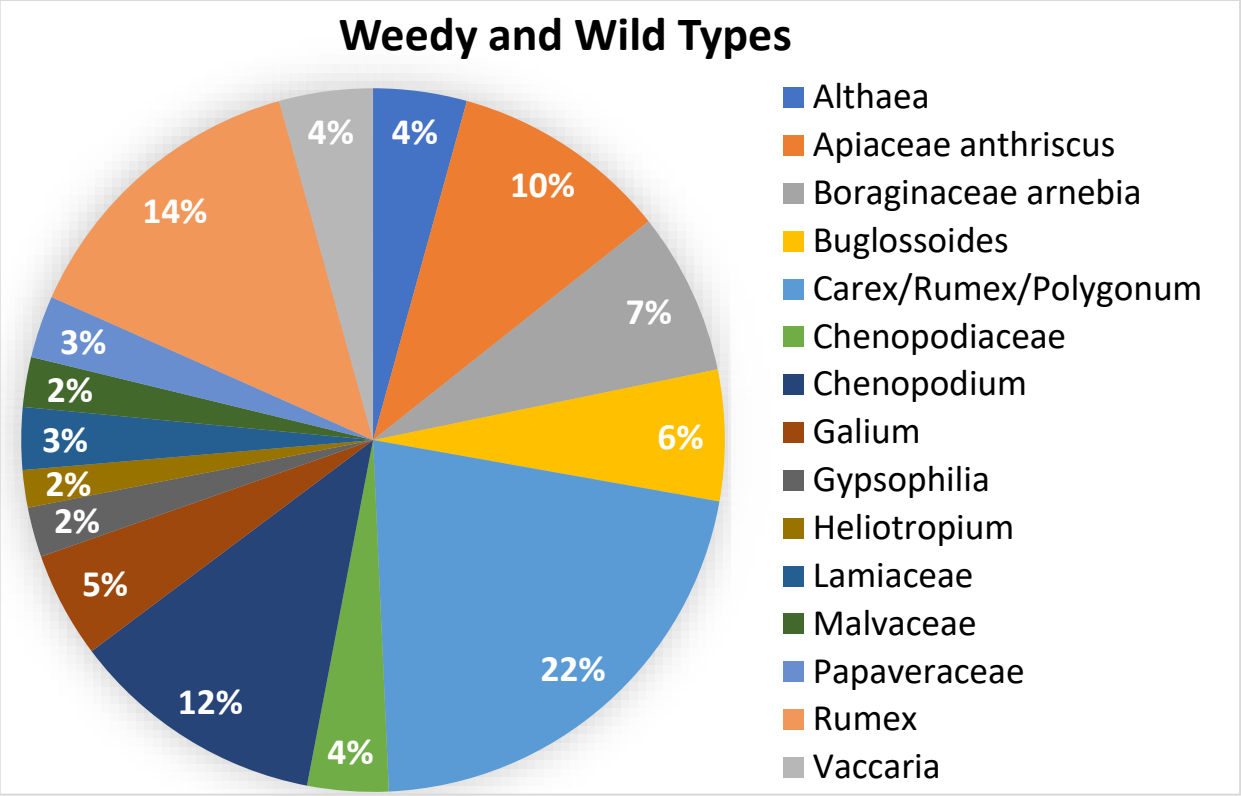

Figure 11: diversity of wild/weedy taxa accounting for >1% total seed count

Taxa with a low ubiquity <11% are chervils (Apiaceae *cf. Anthriscus* sp.), arnebias (Boraginaceae *cf., Arnebia* sp.), and red sorrel (*Rumex* sp.). *Rumex* sp. is considered a part of the *Carex/Rumex/Polygonum* taxa as they are often categorized together to avoid misidentification but were considered identifiable to *Rumex* sp. in one sample.

The wild/weedy taxa have diverse habitats, indicating various seasonality, climates, and environments. The highest percentage of the wild/weedy seeds are those of goosefoot (Chenopodiaceae/*Chenopodium* sp.) and sorrels (*Carex/Rumex/Polygonum*). As stated earlier, these types of plants grow in wetland environments.

Sorrels (*Carex/Rumex/Polygonum*) were used for food or medicinal purposes for skin diseases during this era throughout Europe and Asia (Li et. al. 2022). Previous research shows

evidence of sorrels being used dating back to ancient times in China, which may have paralleled the distribution of rice to this region in Armenia as well (Li et. al. 2022). Further research would be needed to propose any cultivation, but it is most likely that these were just wild weeds gathered during this time that may have been unintentionally distributed in discarded plant materials (the seeds were charred).

Goosefoot (Chenopodiaceae/*Chenopodium* sp.) was also potentially used for medicinal purposes. This weed was more commonly seen of importance in Indigenous cultures of North America (Belcher et. al. 2023). Goosefoot was not an important part of the culinary culture in Arpa and surrounding villages in Armenia during the medieval period (Belcher et. al. 2023). It was most likely a weed that was occurring alongside crops.

Chervils (Apiaceae *cf., Anthriscus*), arnebias (Boraginaceae *cf. Arnebia*), gromwell (*Buglossoides* sp.), bedstraw (*Galium* sp.), baby's breath (*Gypsophilia* sp.), heliotropes (*Heliotropium* sp.), mint (Lamiaceae), mallows (Malvaceae), poppy (Papaveraceae), and cow soapwort (*Vaccaria* sp.) were also wild/weedy types that contributed to the data. They are common field weeds—often of dry-farmed winter cereals-- and wildflowers.

The diversity of these taxa provides us information about the environments and can provide insight about agricultural systems and techniques as well as what may have been grown alongside these weeds, but further identification and analysis of the wild/weedy types would be needed. Many of these taxa could have been used for livestock fodder or fueling purposes (Hovsepyan & Wilcox 2008).

Figure 12: Charred archaeobotanical remains identified as weeds. *Taxonomy*: 1- Sorrel (*Carex/Rumex/Polygonum*); 2- Goosefoot (*Chenopodium* sp.)

Conclusion

The information gathered from the Arpa village site builds upon and enriches knowledge of agricultural practice and exchange from the medieval trade networks of Armenia. This analysis can be comparable to those cited earlier within this report and develop new insights as to what the lifestyle and land usage practices were as a geographical region overall. Arpa provides archaeobotanical evidence of new agricultural strategies being employed as the trade network introduces crops and plants from Eastern Asia. New agricultural strategies include the possible usage of summer crops as well as wetland and dry field cultivation suggested by the various landscapes needed from the collection of varying taxa. Arpa also provides evidence of land tenure and dedication to the more laborious crops of perennial orchards and vineyards. Some of these botanical remains were distributed to Armenia using the Silk Road and shows how domestication of plants has traveled. These archaeobotanical remains are also suggestive of temperate patterns and environmental structures during the 13th century in Arpa. We can connect

several types of research to the study of archaeobotany in the Southern Caucus to reveal the lifestyle and culture of these medieval settlements.

Trade systems through the Arpa village were strong, and additional excavations of Arpa can provide us more evidence to further our knowledge gained from this analysis. The cereals, fruits/nuts, pulses, and weeds provide beneficial data to uncover the archaeobotanical questioning discussed throughout this study and invoke new hypotheses proposed by rarer taxa. This report will further the field of archaeobotanical research in Armenia and the Southern Caucus.

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Table 2: Arpa Archaeobotanical Samples

	FIELD SAMPLE #	AS2 Δ8	AS2 Δ10	AS2 Δ13.1	AS2 Δ13.2	AS2 Δ18	AS4 Δ3	AS4 Δ9	AS6 Δ37	AS6 Δ22	
	LAB #	AS2.8	AS2.10	AS2.13.1	AS2.13.2	AS2.18	AS4.3	AS4.9	AS6.37	AS6.22	
	CONTEXT	collapse	pit	tonir	tonir	vessel	fill of tonir-associated basin	floor	tonir(top)	tonir(middle)	
	VOLUME (mL)	148	75	170	90	19	104	30.6	105	68	
	FLOATED VOLUME (L)	1	1	1	1	1	1	1	7	7	
FAMILY											TOTALS
Aegilops sp.	Poaceae								3		3
Allium sp.	Lilicaceae	1									0
Apiaceae	Apiaceae						1				1
Apiaceae c.f. bupleurum sp.	Apiaceae								1		1
Apiaceae c.f. foeniculum sp.	Apiaceae								1		1
Apiaceae c.f. anthriscus sp.	Apiaceae								35		35
Asteraceae	Asteraceae						1				1
Bifora radiens	Apiaceae								1		1
Boraginaceae	Boraginaceae	1			1		2				3
Boraginaceae arnebia sp.	Boraginaceae								26		26
Boraginaceae alkanna tinctoria	Boraginaceae				1						1
Boraginaceae c.f. lycopsis	Boraginaceae					1					1
Brassicaceae	Brassicaceae						1		1		2
Buglossoides sp.	Boraginaceae	6		6	5		4				15
Carex/rumex/polygonum	Cyperaceae/ Polygonaceae	38		1	1		4		14	17	37
Caryophyllaceae	Caryophyllaceae								1	1	2
Cephalaria sp.	Caprifoliaceae								2		2
Chenopodiaceae	Chenopodiaceae				4			2	7		13
Chenopodium sp.	Chenopodiaceae	9		17			1		8	6	32
Cyperaceae	Cyperaceae			1						3	4
Cyperus sp.	Cyperaceae									2	2
Echium sp.	Boraginaceae									1	1
Euphorbia sp.	Euphorbiaceae									1	1
Fabaceae	Fabaceae								7		7
Fumaria	Papaveraceae						1				1
Galium sp.	Rubiaceae	4		1			2		9	1	13
Gypsophilia sp.	Caryophyllaceae	1		2					5		7
Heliotropium sp.	Boraginaceae	1							5		5
Hordeum sp.	Poaceae						1		3		4
Hordeum vulgare	Poaceae									4	4

Hypericum sp.	Hypericaceae									1	1
Lamiaceae	Lamiaceae				5			1	4		10
Liliaceae	Lilicaceae								1		1
Lolium sp.	Poaceae					1				2	3
Malvaceae	Malvaceae	1		1			1		4	1	7
Orinthogalum sp.	Asparagaceae								3		3
Oryza sativa	Poaceae	1				1					1
Panicum miliaceum	Poaceae								1		1
Papaveraceae	Papaveraceae	1							9		9
Phalaris sp.	Poaceae								1		1
Pinus sp.	Pinaceae								1		1
Plantaginaceae	Plantaginaceae									1	1
Poaceae	Poaceae	1		1					11	2	14
Portulaca sp.	Portulacaceae	1				1				1	2
Prunus persica	Roasaceae								1		1
Punica granatum	Lythraceae								1		1
Reseda sp.	Resedaceae					1					1
Rosaceae	Roasaceae									1	1
Rumex sp.	Polygonaceae								49		49
Salsola sp.	Amaranthaceae								1		1
Saponaria sp.	Caryophyllaceae	1									0
Silene sp.	Caryophyllaceae								1		1
Setaria italica	Poaceae	1							2		2
Setaria sp.	Poaceae								6		6
Setaria c.f. viridis	Poaceae								1		1
Small wild legume	Fabaceae	3							5	2	7
Solanaceae	Solanaceae			1							1
Thymelaceae	Thymelaceae								1		1
Trigonella sp.	Fabaceae									1	1
Triticum aestivum/durum	Poaceae	2					1		7	10	18
Triticum rachis fragment	Poaceae			1						1	2
Triticum sp.	Poaceae						1				1
Vaccaria	Caryophyllaceae	1							14		14
Vicia ervillia	Fabaceae								1		1
Vitis sp.	Vitaceae	1				2			1		3
Ziziphora sp.	Lamiaceae						1				1
TOTAL SEED COUNT		75	0	32	17	7	22	3	255	59	395