

Assessment of Charcoal samples from Girag Kasam, Azerbaijan

Author: Imogen Poole
Address: G3, Eiteren 99, 3401 PS, IJsselstein, The Netherlands
Email: i.poole@geo.uu.nl / ivanbergenpoole@yahoo.co.uk
Telephone: 00 31 30 2535068 / 6884513
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Contents

1. Introduction	2
2. Materials and Methods	2
3. Results	3
3.1 Sample 1: SCP05 KP405 Kv13 pit	3
3.2 Sample 2: SCP05 KP405 Kv13 tandir 0.30m.....	3
3.3 Sample 3: SCP05 KP405 Kv13 pit	3
4. Discussion & Conclusions	4
5. References	5

1. Introduction

Charcoal was recovered from an excavation at a site (KP405) approximately 2 km from the village of Girag Kasaman during the summer of 2004. The site appears to be an example of a small, open rural settlement and represents the earliest example of a domestic settlement. This site along with other settlements, at KPs 289 Faxrali, 301 Hadjiali, 342 Dashbulaq and 409 Poylu, are examples of medieval settlements that have been found along the route of the BTC pipeline. Site KP405 is thought to predate the other sites. Girag Kasaman lies about 30km east of the border with Georgia in close proximity geographically to the Greater Caucasus mountains.

The settlement KP405 was located on a terrace (230 m asl) overlooking the flood plain of the Kura River, possibly near an ox-bow lake, on the eastern side of a hill below an extensive post-medieval cemetery. On the western and central part of the hill a large number of post medieval graves have also been located. There is some potential evidence for an early phase to the site with the identification of a Kura-Araxes pottery vessel (dating to c. 4000 – 2200 BC). Additional work to the east of the hill identified further deep deposits including a number of complete jars. The majority of the features on this settlement site are buried to a depth of around 1m. A large quantity of medieval pottery possibly of the 10th – 12th century has been recovered. The early medieval deposits are well preserved and sealed with deposits that appear to have formed rapidly. If it is correct that there was only one phase of occupation there is the potential to secure a close date range from a selection of vessel types. The apparent absence of imported, decorated wares could reflect the early and remote location of the site. The layers of burning and large charcoal deposits could indicate some form of industrial activity.

Three samples from site KP405 were sent for analysis: Samples 1 and 3 originated from rubbish pits and the third sample (Sample 2) originated from a 'tandir' type bread oven.

2. Materials and Methods

The condition of the charcoal was generally good with the majority of the samples being well preserved. All large pieces of charcoal material from the three samples were subject to investigation. The remaining smaller pieces were either probable fragments off the larger material and too small and/or poorly preserved to identify. Samples were prepared using standard techniques (Gale and Cutler 2000). Anatomical structures were examined using reflected light on an Olympus BX41 microscope. Each sample was examined to determine quality of preservation, content and taxonomic diversity using x4, x10, x20 and x40 objectives. Taxonomic comparisons were made, when necessary, with the wood slide collection housed in the Utrecht University branch of the National Herbarium of the Netherlands and relevant literature (e.g. Parsa Pajouh & Schweingruber 1985). The material

from all three samples was allocated a specimen number to facilitate future reference if necessary.

3. Results

The taxa identified are presented in Tables 1 and 2. It must be noted that wood anatomy alone is often not enough to secure identification to individual species. Anatomical characters of the charcoal samples studied are consistent with the following taxa: *Quercus* sp. and *Ulmus* sp.

Table 1: Summary of the taxonomic identity of the charcoal identified from Girag Kasaman, Azerbaijan

Family (subfamily)	Genus/species	Common name	Comments
Sample 1: SCP05 KP405 Kv13 pit			
Fagaceae	<i>Quercus</i> sp.	oak	all deciduous
	<i>Ulmus</i> sp.	elm	
Sample 2: SCP05 KP405 Kv13 tandir 0.30m			
	<i>Ulmus</i> sp.	elm	
Sample 3: SCP05 KP405 Kv13 pit			
	<i>Ulmus</i> sp.	elm	

3.1 Sample 1: SCP05 KP405 Kv13 pit

The material from Sample 1 originated from one of the rubbish pits located at the site. The wood ranged from relatively small diameter twig/branch material to fragments of distorted wood, which probably originated from larger diameter material. The wood anatomical characteristics of all specimens were consistent with that of either *Quercus* or *Ulmus* (Tables 1 and 2). The *Quercus* material was distinctly ring porous in all specimens and therefore is considered to be deciduous.

3.2 Sample 2: SCP05 KP405 Kv13 tandir 0.30m

The material from Sample 2 originated from one of the 'tandir' type bread ovens located at the site. The wood ranged from relatively small diameter twig material (<3 cm in diameter) to fragments of wood from diameters of unknown estimate (but >6cm diameter). The wood anatomical characteristics of all specimens were consistent with that of *Ulmus* (Tables 1 and 2).

3.3 Sample 3: SCP05 KP405 Kv13 pit

The material from Sample 3 originated from one of the rubbish pits located at the site. The wood ranged from small diameter twig material (1 cm diameter) to fragments of relatively

more mature wood from diameters of unknown estimate. The wood anatomical characteristics of all specimens were consistent with that of *Ulmus*. When the specimen is allocated ?*Ulmus* identity this means that the anatomy in all three planes of section could not be verified but those sections where the characters could be verified were consistent with that of *Ulmus*.

4. Discussions and Conclusions

Large parts of Azerbaijan are dominated by high mountains with extensions of the Caucasus in both the southeast and northwest. At high altitudes the landscape is rugged but the foothills are home to deciduous forests of oak (*Quercus*), beech (*Fagus*) and ash (*Fraxinus*). Between the two mountain ranges lie an extensive lowland plain, named the Kura-Aras plain. This region is intersected by eight major river, which drain into the Caspian Sea. It is on one of these rivers, the Kura river, that the medieval settlement was uncovered. Along the flood plain, forests comprising the relic oak species, *Quercus pedunculiflora*, and species of poplar (*Populus nigra* and *P. hybrida*) dominate. Other characteristic species are elm (*Ulmus carpinifolia*), willow (*Salix excelsa*), lime (*Tilia caucasica*) and Tamarisk (*Tamarix ramosissima*). Today these forests only occupy 5-7% of their original range probably having succumbed to deforestation, which included exploitation of the wood for local charcoal production.

During the medieval period it appears, from these finds at site KP405, that both oak and elm were important local resources. Traditionally both taxa have a history of been used for domestic items and construction, although the end product determines the wood selected. Oak and elm have also recorded for other uses such as occupational artefacts, tanning, transport and weapons (Gale and Cutler 2000).

Oak wood and charcoal have a higher calorific value than many other woods including elm. They make a long lasting fuel although oak charcoal requires good ventilation (Webster 1919, Hughes 1954, Porter 1990). Remains of oak as a fuel, as charcoal or kindling, has been found from northern Europe and the Mediterranean region (Gale and Cutler 2000). Elm on the other hand is renown for its low calorific value and thus is not used as a traditional fuel.

Although tough, elm wood is difficult to work and coupled with its perishable nature when in contact with the ground, has not been widely used for above ground construction. When permanently wet however submerged elm becomes extremely durable and thus has traditionally been used for subterranean construction and projects associated with water ways (e.g. Taylor et al. 1976). Conversely oak wood is easy to cleave and has provided one of the most important building materials since the prehistoric period (e.g. Gale and Cutler 2000).

In conclusion therefore, the identification of both elm and oak at the medieval settlement is not surprising considering that both taxa are represented in the native vegetation. The finding of elm alone in the tandir is somewhat more surprising considering that elm produces little heat - perhaps this is simply a reflection of the required cooking temperature in the bread ovens. Nevertheless both elm and oak were obviously important local resources to the inhabitant of this settlement.

5. References

- Gale R, & Cutler D. 2000. *Plants in Archaeology* Westbury and Royal Botanic Gardens Kew, London.
- Hughes GB. 1954. *Living crafts* Philosophical Library, New York.
- Parsa Pajouh D, & Schweingruber F.H. 1985. *Atlas des bois du nord de l'Iran*. Institut fédéral de recherches forestières Birmensdorf, Switzerland.
- Porter V. 1990. *Small woods and hedgerows*. Pelham Books.
- Taylor G, Holmes G, Hood RK, & Brazier J. (eds). 1976. *International book of wood*. Mitchell Beazley.
- Webster AD. 1919. *Firewoods their production and fuel values* T. Fisher Unwin Ltd, London.

Other information was obtained from:

Richard Moore

<http://www.shootingonlocation.com/countryguide/aj.htm>

<http://www.ecotourism.aznet.org/naturalobjects/3.html>

Table 2: Detailed results of the charcoal specimens identified from the three samples originating from Girag Kasaman, Azerbaijan; Φ diameter

Sample	specimen number	taxonomic affinity	comments
Sample 1: SCP05 KP405 Kv13 pit	1	<i>Quercus</i> sp.	part of relatively large diameter organ
	2	<i>Quercus</i> sp.	gnarled and distorted
	3	<i>Quercus</i> sp.	branch >3 cm Φ
	4	<i>Quercus</i> sp.	branch >3 cm Φ
	5	<i>Quercus</i> sp.	branch
	6	<i>Ulmus</i> sp.	branch/twig 2.5 cm Φ estimated
	7	<i>Ulmus</i> sp.	branch/twig 3.5 cm Φ estimated
	8	? <i>Quercus</i> sp.	fragment
	9	<i>Quercus</i> sp.	fragment
	10	? <i>Quercus</i> sp.	fragment gnarled and poorly preserved, friable
	11	<i>Quercus</i> sp.	fragment
	12	<i>Quercus</i> sp.	fragment
Sample 2: SCP05 KP405 Kv13 tandir 0.30m	1	<i>Ulmus</i> sp.	c. 3 cm Φ probably of twig origin
	2	<i>Ulmus</i> sp.	4 cm Φ with central pith of small branch/large twig origin
	3	<i>Ulmus</i> sp.	fragment with no central region
	4	<i>Ulmus</i> sp.	fragment with no central region
	5	<i>Ulmus</i> sp.	outer fragment of small branch/large twig with more early wood than late wood
	6	<i>Ulmus</i> sp.	2.5 cm Φ with central pith
	7	<i>Ulmus</i> sp.	5 cm Φ est., outer fragment of small branch/large twig
	8	<i>Ulmus</i> sp.	fragment
	9	<i>Ulmus</i> sp.	inner fragment with no central region from small branch/large twig
	10	<i>Ulmus</i> sp.	fragment of predominantly early wood
	11	<i>Ulmus</i> sp.	fragment of early wood
	12	<i>Ulmus</i> sp.	fragment
	13	<i>Ulmus</i> sp.	fragment
	14	<i>Ulmus</i> sp.	fragment of predominantly early wood
	15	<i>Ulmus</i> sp.	fragment
	16	<i>Ulmus</i> sp.	fragment of early and latewood
	17	<i>Ulmus</i> sp.	fragment
	18	<i>Ulmus</i> sp.	fragment of predominantly late wood

Table 2: continued...

Sample 3: SCP05 KP405 Kv13 pit		
1	<i>Ulmus</i> sp.	1.5 cm Φ twig with bark and indications of side branches
2	<i>Ulmus</i> sp.	1.5 cm Φ twig with bark and pith
3	? <i>Ulmus</i> sp.	fragment
4	<i>Ulmus</i> sp.	fragment of large twig/small branch
5	<i>Ulmus</i> sp.	inner portion of large twig/small branch
6	<i>Ulmus</i> sp.	minimum 1 cm Φ estimated, centre present
7	<i>Ulmus</i> sp.	1 cm Φ twig with indication of side branch
8	<i>Ulmus</i> sp.	1 cm Φ estimated, twig
9	? <i>Ulmus</i> sp.	compressed/distorted anatomy difficult to get true planes of section
10	<i>Ulmus</i> sp.	fragment of relatively mature wood
11	<i>Ulmus</i> sp.	1.5 cm Φ estimated, twig with no inner and central portion
12	? <i>Ulmus</i> sp.	distorted wood but anatomy of longitudinal section consistent
13	<i>Ulmus</i> sp.	c. 2 cm Φ estimated, inner portion of relatively large twig with no central region present
14	<i>Ulmus</i> sp.	fragment of relatively large diameter twig with no central portion
15	<i>Ulmus</i> sp.	fragment
16	<i>Ulmus</i> sp.	fragment of outer part of twig
17	<i>Ulmus</i> sp.	fragment of outer part of twig
18	<i>Ulmus</i> sp.	fragment of relatively large diameter material
19	<i>Ulmus</i> sp.	fragment
20	<i>Ulmus</i> sp.	fragment