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Rough Cilicia Archaeological Survey: Report of the 2011 Season, Part One

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Rough Cilicia Highland Archaeological Survey, Report of the 2011 Season

Part One: Deforestation Research

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Introduction

The 2011 season of the Rough Cilicia Archaeological Survey Project was conducted between July 21 and August 12 2011. Participants included project director, Prof.. Nicholas Rauh of Purdue University, Dr. Ünal Akkemik of the University of Istanbul Department of Forest Botany, Prof. Mathew J. Dillon of Loyola Marymount University (Los Angeles), Lawrence Theller (MA), geologist at Purdue University, Rebecca Theller (MA) soil specialist at Purdue University, graduate students Tuncay Güner of the University of Istanbul, Caroline Autret of the University of Paris, Grace Conyers of Purdue University, and undergraduate students, Denis Cirit of Sage Hill High School in California, Matthew J. Dillon Jr. of Fordham University, Amber Hawley of University of Wisconsin at Lacrosse, Kevin Kay of the University of Evansville, and David O'Brochta of the University of Maryland. Our service representative was Yusuf Kiraç from the General Directorate for Cultural Heritage and Museums in Ankara.¹

¹ This report was transformed from an html format into a PDF by Stanislav Pejša, the data curator at PURR in April 2018. The article was lightly edited in order to accommodate the different presentation format. Typos and minor character encoding issues were corrected.

The research agenda of the 2011 was to investigate the degraded character of highland cedar forests in the Taşeli Plateau in the Taurus Mts behind Gazipaşa (Antalya Province, Gazipaşa District, Taseli Plateau). We worked in the Taseli plateau highland region from July 25 to Aug. 5, collecting tree, pollen, and carbon samples of the highland forest; we then relocated to the Baysal Hotel in Gazipaşa to conduct archaeological survey in the midlands (*mesogeia*) between Aug. 6 and 12. We explain the procedures and the results of both phases of the survey in two parts. This section (Part One) will address the deforestation research of the 2011 Survey; Part Two will address the finds of the 2011 Pedestrian Survey. As the mid-range theory Rough Cilicia highland survey has been investigating the possibility that resource depletion played a role in population collapse at the end of the Roman era. Throughout antiquity the forests of these mountains were praised for their lofty conifer trees, particularly cedar trees whose rot-resistant properties made them desirable for shipbuilding. By the beginning of the 20th century, this forest was essentially exhausted. While scholars agree that human activity played a determining role in deforestation, the timing and pace of pre-modern forest utilization is poorly understood. Our paleoenvironmental work this season embraced two related strategies, dendrochronological investigation of the surviving highland forest, and geomorphic trench excavations of alluvial deposits along river basins, carbon and pollen analysis of soil samples. To conduct the highland survey we positioned ourselves at a rental house at Gökgözlük Yayla for approximately 10 days. During that time we conducted geomorphic trench sampling of cedar and pollen residue at the altitude representing the natural habitat of the highland forest (1500 to 1800 m elevation).

Dendrochronological Survey

Figure 1: RCSP Tree-Ring Sampling Locations

In 2007 the team observed that summer inhabitants of the yayla district have been excavating soil from highland alluvial deposits for their summer gardens, leaving exposed pits of rich alluvial soil. The team examined nine such pits and road cuts at the elevation of the cedar forest, essentially in the same areas where Unal Akkemik has been conducting dendrochronological survey of relic highland forests since 2007. We also obtained carbon samples from the exposed pit of a large mound or hill at Mühüler where a deep layer of carbon and carbonized tree residue was visible at approximately 2.6 m depth. In all the survey team excavated nine pollen trenches listed below. We furnish descriptions of these trenches in the catalogue of trenches below.

All separated carbon and tree residue fragments were sent to the laboratory of Dr. Unal Akkemik at the University of Istanbul. As required by our permit regulations at each trench the team extracted 4 sets of pollen samples: one for the laboratory of Unal Akkemik,

one for the laboratory of Dr. Hulya Caner of the Institute for Marine Sciences and Management at the University of Istanbul, one for the soil archive of the Aegean Agricultural Research Institute (AARI), Izmir Menemen Ege Tarımsal Araştırma Enstitüsü'deki Ulusal Gen Bankası (Menemen/Izmir); and one for the soils research laboratory at the T.C. Tarım ve Köy İşleri Bakanlığı, Ankara Tarlı Tarım Bitkileri Merkez Araştırma Enstitüsü (Yenimahalle/Ankara). Attached cargo receipts demonstrate that we shipped the samples to these places as requested. The samples for Akkemik and Caner were sent first to the laboratory of Hasan Can of the HC Jeolojik Hizmet Danışmanlığı in Ankara for preparation prior to pollen analyses (cargo receipt). Prepared samples have already been delivered to the laboratory of Unal Akkemik and Nurgul Karlioglu (cargo receipt). The results of the pollen analysis of Trench 8 at Mevlutlu Yayla are discussed in the Trench catalogue below. In addition to the trench excavations Unal Akkemik conducted tree ring research in the same approximate area of the Gazipaşa highland (Taseli Plateau). He obtained 25 samples from cedar, juniper, and black pine trees. They show a decided pattern of synchronous harvesting events during the Early Modern Era (Table 1). In Table 2 we display the total range of the samples that Akkemik has obtained from the Gazipaşa district throughout the survey.

Table 1: Evidence of Synchronous Harvesting Events in the Gazipasha Highlands

Table 2: RCSP Tree Ring Samples, 2004-2011

ite Code	Site Name	Collected Species	Diameter at 1.30 m	Time span of the trees	Altitude	Coordinates
BEL01	Belbasi Plateu	<i>Pinus nigra</i>	150 cm	1835-2008	1718 m	N 36° 27' 25,3" E 32° 27' 56,4"
BEL02		<i>Pinus nigra</i>	110 cm	1771-2008	1744 m	N 36° 27' 26,7" E 32° 27' 56,1"
BEL03		<i>Pinus nigra</i>	80 cm	1658-2008	1747 m	N 36° 27' 25,4" E 32° 27' 58,5"
BEL04		<i>Pinus nigra</i>	90-100 cm	1712-2008	1718 m	N 36° 27' 22,3" E 32° 27' 58,7"
MAH01	Maha Plateu	<i>Pinus nigra</i>	100 cm	1495-2011	1507 m	N 36° 29' 55" E 32° 27' 43"
MAH10		<i>Pinus nigra</i>	140 cm	1489-2007	1453 m	N 36° 29' 7" E 32° 27' 7"
MAH11		<i>Pinus nigra</i>	140 cm	1553-2007	1466 m	N 36° 29' 4" E 32° 27' 8"
MAH12		<i>Pinus nigra</i>	125 cm	1492-2007	1483 m	N 36° 29' 3" E 32° 27' 6"
MEV7	Mevlutlu Plateu	<i>Juniperus foetidissima</i>	95 cm	1758-2007	1741 m	N 36° 31' 34" E 32° 30' 33"
MEV8		<i>Cedrus libani</i>	130 cm	1598-2007	1721 m	N 36° 31' 39" E 32° 30' 29"
MEV9		<i>Pinus nigra</i>	120 cm	1243-2007	1662 m	N 36° 31' 44" E 32° 29' 39"
AKC1	Akcal Plateu	<i>Cedrus libani</i>	130 cm	1601-2007	1796 m	N 36° 31' 6" E 32° 31' 27"
AKC2		<i>Cedrus libani</i>	125 cm	1616-2007	1809 m	N 36° 31' 5" E 32° 31' 27"
AKC3		<i>Juniperus foetidissima</i>	90 cm	1768-2007	1826 m	N 36° 31' 5" E 32° 32' 30"
AKC4		<i>Juniperus foetidissima</i>	140 cm	1644-2007	1806 m	N 36° 31' 4" E 32° 31' 28"
AKC5		<i>Cedrus libani</i>	95 cm	1729-2007	1796 m	N 36° 31' 4" E 32° 31' 27"
CAL01	Akçal - Mırıklar Yaylası Boğazı	<i>Pinus nigra</i>	110 cm	1630-2011	1755 m	N 36 30 37-36 30 55 E 32 31 20-32 31 28
CAL02		<i>Juniperus foetidissima</i>	60 cm	1840-2011	-	
CAL03		<i>Juniperus foetidissima</i>	60 cm	1570-2011	1768 m	

ite Code	Site Name	Collected Species	Diameter at 1.30 m	Time span of the trees	Altitude	Coordinates
CAL04	Akçal Plateu South Part	<i>Juniperus foetidissima</i>	75 cm	1727-2011	1817 m	N 36 29 58 E 32 29 37
CAL05		<i>Cedrus libani</i>	80 cm	1566-2011		
CAL06		<i>Cedrus libani</i>	90 cm	1803-2011		
CAL07		<i>Pinus nigra</i>	115 cm	1615-2011		
CAL08		<i>Cedrus libani</i>	70 cm	1568-2011		
CAL09		<i>Pinus nigra</i>	100 cm	1618-2011		
CAL10		<i>Cedrus libani</i>	90 cm	1705-2011		
CAL11		<i>Pinus nigra</i>	90 cm	1623-2011		
CAL12		<i>Juniperus foetidissima</i>	65 cm	1770-2011		
CAL13		<i>Cedrus libani</i>	110 cm	1720-2011		
AKL01		<i>Cedrus libani</i>	130 cm	1805-2011		
AKL02		<i>Juniperus foetidissima</i>	100 cm	1805-2011	1774 m	N 36 30 14 E 32 29 33
SUG15	Sugözü Plateu	<i>Juniperus foetidissima</i>	120 cm	1746-2007	1587 m	N 36° 27' 15" E 32° 27' 23"
SGK01	Sogukoluk Plateu	<i>Cedrus libani</i>	140 cm	1751-2008	1626 m	N 36° 26' 27" E 32° 28' 42,3"
SGK02		<i>Cedrus libani</i>	150 cm	1763-2008	1626 m	N 36° 26' 27" E 32° 28' 42,3"
SGK03		<i>Cedrus libani</i>	120 cm	1815-2008	1586 m	N 36° 26' 20,6" E 32° 28' 43,3"
SGK04		<i>Cedrus libani</i>	120 cm	1781-2008	1572 m	N 36° 26' 19,6" E 32° 28' 43,9"
SGK05		<i>Cedrus libani</i>	140-150 cm	1745-2008	1588 m	N 36° 26' 21,6" E 32° 28' 37,9"
SGK06		<i>Pinus nigra</i>	90 cm	1745-2008	1588 m	N 36° 26' 21,7" E 32° 28' 32,2"
CIK01	Çıgılık Geçidi	<i>Pinus nigra</i>	100 cm	1795-2011	1743 m	N 36° 20' 49" E 32° 31' 54"
CIK02		<i>Pinus nigra</i>	100 cm	1740-2011	1741 m	N 36° 20' 36" E 32° 31' 56"
CIK03		<i>Pinus nigra</i>	100 cm	1600-2011	1741 m	N 36° 20' 36" E 32° 31' 56"
CIK04		<i>Pinus nigra</i>	90 cm	1840-2011	1747 m	N 36° 20' 34" E 32° 31' 54"
CIK05		<i>Pinus nigra</i>	110 cm	1740-2011	1738 m	N 36° 20' 26" E 32° 31' 52"

ite Code	Site Name	Collected Species	Diameter at 1.30 m	Time span of the trees	Altitude	Coordinates
CIK06		<i>Juniperus foetidissima</i>	40 cm	1805-2011	1738 m	N 36° 20' 26" E 32° 31' 52"
CIK07		<i>Juniperus foetidissima</i>	50 cm	1940-2011	1914 m	N 36° 21' 15" E 32° 31' 50"
CIK08		<i>Juniperus foetidissima</i>	115 cm	1615-2011	1742 m	N 36° 20' 51" E 32° 31' 54"
CIK09		<i>Juniperus foetidissima</i>	120 cm	1615-2011	1743 m	N 36° 20' 49" E 32° 31' 56"

Catalogue of Geomorphic Trench Excavations, Gazipaşa Yayla District 2011

Figure 2: 2011 RCSP Pollen Trench Locations

Table 3: Pollen Trench Data: Names, Locations, Samples.

Item	Location	Trench	X_Coord	Y_Coord	Elev.	Samples
1	Gökgözlük	trench 1	455610.78876	4030786.76484	1830	21
	Yayla					
2	Dere Gözü	trench 2	455820.03699	4026641.49059	1872	19
	Yayla					
3	Dere Gözü	trench 3	455830.87894	4026656.96493	1876	31
	Yayla					
4	Günnercik	trench 4	459843.80414	4032094.97325	1790	5
	Yayla					
5	Günnercik	trench 5	457789.76345	4032175.74876	1779	16
	Yayla					
6	Maha Yayla	trench 6	451525.76967	4036116.58750	1580	2
7	Maha Yayla	trench 7	451295.32365	4037036.37140	1509	10
8	Mevlutlu	trench 8	452406.68951	4040700.79983	1570	24
	Yayla					
9	Beobasi	trench 9	457433.00000	4040413.00000	1739	13
10	Yayla	Carb.	457672.00000	4037804	1740	tree and
	Muhuler	forest				carbon
						(7)

Trench 1, Gökgözlük Yayla (UTM 36N, E 455610.78876, N. 4030786.76484, Elevation 1830 m, 07/26/2011)

Figures 3-4: Views of Trench 1, Gökgözlük Yayla

Figures 5-6: Dressed Scarp and Profile Drawing of Trench 1

At 1830 m elevation the team located an exposed pit (2.6 m tall) in a drainage depression formed by a large sink hole in otherwise barren terrain. The pit was located approximately 1 km from our camp house at Gökgözlük Yayla on the road leading to the neighboring Gümnercik Yayla to the north. The top 80% of the trench exhibited a somewhat well drained soil with little to no mottling. Clay content and moisture increased with depth. The lower 40 cm of the trench exhibited clear mottling along with wet, hard dense clay that gradually changed to a hard, friable mudstone in the last 20 cm of the trench. The soil coloration was 10 YR 4/6. The team dressed the scarp of the pit and extracted samples every ten cm to a depth of 2.4 m, extracting 21 sets of samples in all (see figures 3-6).

Trench 2 and 3: Dere Gözü Yayla (Fig. 7)

Figure 7: General view of Dere Gözü Yayla

Trenches 2 and 3 were both located at excavated pits near a utilized spring above a road cut high above the village of Dere Gözü. Trench 2 (elevation 1872 m) was slightly below and to the east of Trench 3 (elevation 1876 m) by 4 meters.

Trench 2 (UTM 36 N, 455820.03699; 4026641.49059; Elevation 1872 m, 19 samples; 07/27/2011)

Figure 8: View of trench 2

Figures 9-10: Dressed Scarp and Profile of Trench 2

When dressed, the scarp of Trench 2 was 2.2 m tall. At the top of the scarp were poorly sorted weathered rocks and numerous roots from the overlying substrate for the top 30 cm (10 YR 4/3). The next 40 cm exhibited poorly sorted, highly weathered rocks in a coarse, silty grained matrix. This graded into a silty, fine grained, and well sorted segment that exhibited erosional surfaces. Mottling began further down at approximately 1.35 m, which gradually graded into a 10 cm thick layer characterized by coarse grained, poorly sorted, and minimally rounded sediment. Below this was friable siltstone to the bottom of the well. The team dressed the scarp of the pit and extracted samples every ten cm to a depth of 1.9 m, extracting 19 sets of samples in all (see figures 8-10).

Trench 3 (UTM 36N 455837; 4026648; Elevation 1885 m; 31 samples; 07/37/2011)

Figures 11-12: Views of Trench 3

Figures 13-14: Dressed Scarp and Profile of Trench 3

Trench 3 was situated slightly higher up slope along the same road as Trench 2 described above. It exhibited a very different soil profile. Due to the tall height of the exposed scarp of Trench 3 (an excavated pit nearly 7 m tall), a step trench, approximately 5.5 m tall, was cut to allow proper reading of the exposed soils. The top of the scarp was rich in organic materials (little root fragments descending from above) for the first 20 cm. Below that were loose, weathered limestone rocks in a silty matrix for 80 cm (7.5 YR 4/3). The trench profile then changed dramatically to exhibit a few very large fragments of limestone at about 1 m from the top. The second section of the trench was started at 1.3 m, and later removed for sampling as a vertical profile. The soil profile was recorded before the step was removed, then double checked for consistency afterwards. Step 2 consisted of 1 m of silty homogeneous soil (10 YR 3/3). A fairly large root fragment was extracted at the 1.6 m mark for sampling and dating. The bottom 20 cm or so of this second section exhibited greater

clay composition. The third section of this profile started at 2.4 m and was characterized as silty with a slightly clay texture throughout (10 YR 3/3). The fourth section started at 3.5 m and contained some highly weathered rocks scattered throughout a silty clay matrix. Sampling was stopped at the bottom of this section because the sediment was becoming wet and unmanageable. The fifth and final section of trench 3 started at the 4.6 m mark and continued to the bottom at 5.95 m. This last section showed increasingly larger weathered rocks in a silty clay matrix that became increasingly wet with depth (10 YR 3/2). Samples were extracted every 10 cm along the first 2 m of the scarp, and every 20 cm below that (31 sets of samples in all) (see figures 11-14).

Trench 4: Günnercik outwash channel (UTM 36N 459843.80414; 4032094.97325; Elevation 1794 m; 07/28/2011)

Figure 15: View of Dried Stream Bed at Günnercik Yayla

Figure 16: View of Dressed Scarp to Trench 4

Figure 17: Profile Drawing for Trench 4

At the northern end of the long open valley of Günnercik Yayla, the team observed a dried stream bed that channels the annual snow melt through the valley. Locals informed us that as much as 3 m of snow accumulates in this yayla in winter and sometimes renders it a broad shallow lake until late Spring. Most of the houses in the yayla were situated higher up along the rim of the canyon valley. The team dressed a low trench along the approximately 1.75 m tall scarp of the stream bed. The entire profile consisted of poorly sorted, somewhat angular cobbles in an unconsolidated slightly silty sand matrix (10 YR 4/3). The top 40 cm of the scarp exhibited a mix of grain sizes from silty to cobbles, with cobbles being the predominant size. Five sets of samples were collected at 20 cm intervals (1.1 m depth in all) (see figures 15-17).

Trench 5: Günnercik (UTM 36 457789.76345; 4032175.74876; Elevation 1779 m; 16 samples; 07/28/2011)

Figure 18: View of Dried Stream Bed, Günnercik Yayla

Figure 19: View of Trench 5, Günnercik Yayla

Figures 20-21: Dressed Scarp and Profile of Trench 5

At the opposite western end of the valley from the site of Trench 4 lies a sinkhole that empties the drainage system of the valley. A dried gulley runs across the western portion of the valley leading to the sink hole. The team identified a portion of the scarp of the gulley bed as suitable for soil sampling. The area was disturbed by excavations to remove soil for local gardens. The team dressed Trench 5 at a 2.15 m tall cut in the scarp, collecting 16 sets of samples along the top 1.7 m of the scarp (10 YR 3/2). Weathered rocks were visible just below the surface vegetation, but the profile was mostly fine grained, slightly clayey silt. 20 cm from the top, the clay content increased steadily until 50 cm depth where the soil could be characterized as well-drained, silty clay (10 YR 4/3). For 40 cm below this the profile changed to a slight yellow-colored sandy loam with a layer of pebbles near the base (10 YR 4/4). The lowest 10 cm of the scarp exhibited a layer of well weathered cobbles of limestone (see figures 19-21).

Trench 6, 7 and 8, Maha and Mevlutlu Yaylas

Trenches 6, 7, and 8 were sampled in succession along the roads leading northward from Sugözü Yayla at the southern rim of the Taşeli plateau to Maha Yayla at the northern end, directly facing the deep valley of the Goksu River. Trench 6 was sampled along this road below an outwash gully that extended across a road cut. Trench 7 was sampled further north along the road at a low road cut beside a planted stand of young black pine trees. Trench 8 was sampled along a second road that forks east from the main road from Maya to Mevlutlu and Beobaşı Yayla along the northern rim of the plateau. This second road was opened in the past decade by the Turkish Forestry Service in a remote region of relic cedar forests. Trench 8 was dressed approximately 800 m west of the 764-year-old black pine tree that was sampled by Unal Akkemik in 2007. The team identified a tall road cut where the soil looked rich in organic materials directly below a dense old growth forest.

Trench 6 (UTM 36N 451525.76967; 4036116.58750; Elevation 1580 m; 2 samples;
07/29/2011)

Figure 22: General View of Trench 6

Figures 23-24: Dressed Scarp and Profile of Trench 6

Trench 6 was sampled at the bottom a 7 m-tall road cut near Maha Yayla at 1580 m elevation. The surrounding geology demonstrated that this was an outwash channel that is an overburden for the sample trench. Two samples were taken, one from the very bottom of the outwash material from the bottom half meter of the clay soil (see figures 22-24).

Trench 7 (UTM 36N 451295.32365; 4037036.37140; Elevation 1509 m; 10 samples; 07/29/2011)

Figure 25: View of Road Cut, Maha Yayla, Trench 7

Figures 26-27: Dressed Scarp and Profile of Trench 7

Trench 7 was sampled at a shallow road cut in the middle of Maha village (near the çaybahce) where a recently planted stand of black pine trees was visible. The soil profile was characterized by heavily weathered, friable limestone throughout (10 YR 4/3). In the top 50 cm, this limestone is thinly bedded. The middle 20 cm the limestone was in larger pieces set into sandy clay matrix (10 YR 4/4). Roots extending from the trees above truncated where the limestone parent material was massively bedded. Highly weathered limestone was visible for the last 60 cm of the trench. Samples were extracted every 10 cm down the first 1.1 m of the trench (see figures 25-27).

Trench 8 (UTM 36N 457789.76345; 4032175.74876; Elevation 1570 m; 24 samples; 07/29/2011)

Figure 28: General View of Trench 8

Figures 29-30: Dressed Scarp and Profile of Trench 8

Figure 31: Carbon Deposit in Trench 8

RCSP 2011 Trench 8 Pollen Counts

Figure 32: Pollen Diagram for Trench 8

Trench 8 was taken from a rather steep road cut on the southern flank of the road leading from Maha to Mevlutlu Yayla in a dense region of old growth mixed forest of cedar, fir, and black pine. The 764-year-old black pine tree sampled by Akkemik in 2007 stands approximately 800 m east of the road cut in question. The soil profile exhibited rich, reddish, clay soils. This soil underlaid an older section of forest which continued on the other side of the road down the mountain side. A carbon deposit was visible approximately 3 m from the top of the scarp and was extracted for carbon dating. The team dressed the uppermost 3.2 m of the trench and extracted soil samples every 10 cm for the first 1.5 m of the trench, followed by 20 cm samples for the lower 1.7 m of the trench. Some 24 sets of

samples were collected in all. The upper 80 cm of the trench exhibited numerous roots, cobbles, and gravel in a sandy clay matrix (7.5 YR 3/4). In the following 40 cm, the clay content increased, roots end, and cobbles and gravels were more weathered and spaced further apart (7.5 YR 3/3). Clay and moisture content increased whereas cobbles and gravel decreased lower down. Although the carbon samples of 2011 await processing, preliminary pollen analysis of Trench 8 has been completed by Nurgul Karlioğlu to reveal distinct patterns of tree dominance (see figure 37). The team's working assumption is that the historical balance of the region's forest cover can be determined through a comparison of its four principle pollen types. Periods of mature highland forest would have been dominated by cedar and fir pollens; whereas, pollens of the highland colonizers, juniper and black pine, should predominate at times when the natural forest cover of this altitude was depleted. As the table in Figure 32 indicates, declines in cedar pollen counts are visible at 60-90 cm depth, 190 cm depth, and 250 cm depth. These patterns appear to be matched by rising counts of juniper and black pine pollen, with a very significant spike of juniper pollen at 270 cm and a sustained count of black pine pollen between 110 and 210 cm depth. By and large, at trench levels where the pollen count for cedar is pronounced, the other tree pollens are diminished. This suggests that the strategy of comparing relative patterns of pollen concentrations for the four principle tree types of the highland will ultimately reveal important information about the sustainability of this forest over time (see figures 28-32).

Trench 9 (UTM 36N 457433; 4040413; Elevation 1739 m; 13 samples;
08/04/2011)

Figure 33: View of Open Pit, Trench 9, Beobaşı Yayla

Figures 34-35: Dressed Scarp and Profile of Trench 9

Beobaşı Yayla sits at the western edge of a broad open highland meadow within the natural habitat of the cedar forest. Although young and old growth forests grow along the rocky terrain along its northern edge, the broad expanse of the yayla is notable for its stark, highly eroded, treeless character. The treeless character of the highland meadow caused team members to wonder whether the region was naturally treeless as a result of seasonal flooding. Our find of a thick layer of carbonized tree residue at Mühüler (mentioned below) argues to the contrary. Near a small cluster of houses at Beobaşı Yayla the team identified a broad excavated pit of rich terra rosa soil for investigation. The scarp of the pit was approximately 2.5 m tall. After dressing the scarp, the team extracted samples every 20 cm with 13 samples collected in all. The top 10 cm of the trench exhibited grass, roots, and angular pebbles that graded into a sandy clay section with fewer, scattered roots (7.5 YR 5/6). This was broken up by a sharply defined layer of well defined, rounded gravel. Below this gravel deposit, the soil consisted of firm, heavy clay, devoid of roots. Its consistency was broken only by a thin, 5 cm layer of well weathered rock at 1.5 m depth. A 20 cm thick silty clay horizon was visible from 1.8 to 2 m. The dense, hard clay soil then continued to the base of the trench, with small pieces of wood carbon extracted at 2.1 m and 2.2 m (see figures 33-35).

Mühüler Carbonized Forest (UTM 36N 457672; 4037804; Elevation 1740 m; 7 samples; 08/04/2011)

Figure 36: View of Mühüler Landscape

Figure 37: View of Sampling Area, Mühüler

Figure 38, View of Carbon Deposit, Mühüler

Figure 39: David Brochta with Carbonized Tree Fragment

While sampling at Trench 9 the team was informed by local residences that villagers at the neighboring yayla of Mühüler (approximately 3 km south of Trench 9) had excavated pits along a sizeable mound or hill revealing carbonized soil. The team decided to inspect this site when the soil sampling at Trench 9 was complete. As it was late in the day and the team was a considerable distance from its base camp, there was time only for a preliminary examination. In the barren, open rolling plain before the village was a large hill or mound approximately 300 m across with excavated pits visible at opposite ends. The villagers informed the team that they had attempted to excavate soil for their gardens, but they had abandoned their efforts because of the dry gravelly consistency of the soil. In addition, in the pits excavated on either side of the mound they had encountered a remarkably thick layer (more than 50 cm thick) of carbonized sediment. The team confirmed that a consistent layer of carbon was visible at approximately 2.6 m depth along the exposed scarp of the mound and that it was visible at opposite ends of the mound, indicating that it extended through the cross section of the mound. Exposed areas of carbonized residue were more than 50 cm thick; in one section the team extracted a carbonized segment of a tree trunk. The tree trunk and other samples of carbon were extracted and sent to the laboratory of Unal Akkemik at the University of Istanbul. The presence of this mound along the margin of the highland meadow mentioned above indicates that a forest possibly existed here in a previous era and that it was destroyed by fire. Carbon dating of the samples will hopefully furnish us with a date of the fire destruction. The location of this carbonized forest in the heart of the cedar elevation in what is now a highly eroded, barren landscape indicates that our sampling strategies will ultimately enable us to reconstruct the history of this forest and the effect of the anthropene process over time (figures 36-39)