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THE CRUSADER PERIOD FORTRESS : Some archaeobotanical samples from Medieval Gritille

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INTRODUCTION

Gritille Höyük was a small mound in Adıyaman province, southeastern Turkey (fig. 1)[1]. The site yielded a wealth of archaeobotanical materials from Neolithic, Early Bronze Age, and Medieval deposits. A Crusader period fortress covered at least 0.23 ha at the top of the mound, though the Euphrates river cut away some of the Medieval deposit. Most of the charred material analyzed for this report comes from this fortified settlement which suffered violent destruction in the middle of the twelfth century A.D. (fig. 2). At that time, Gritille lay just within the border of the county of Edessa (Urfa), only 10 km upstream from Samsat, the regional center (Redford 1986).

Now flooded by the lake behind the Atatürk Dam, Gritille lay on a stretch of the Euphrates river the Zagrosian xerophilous deciduous steppe-forest zone, where oak dominates. The junction with two other major phytogeographical zones lies within 50 km : the Mediterranean woodland climax, also an oak dominated steppe forest, to the west, and the northern extension of the Syrian steppe to the south (Zohary 1973). In recent times, the trees around Gritille were largely restricted to gardens and the river banks, but the remains of an open oak forest on steep slopes lie only about 20 km from the site (Gil Stein, pers. comm.). Within the zone of rainfall agriculture, Gritille's immediate catchment was never

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1) Between 1981 and 1984 the Gritille excavations were sponsored by Bryn Mawr College with the cooperation of the University of North Carolina, Chapel Hill and the participation of The University Museum (University of Pennsylvania) under the direction of Dr. Richard Ellis and under the auspices of the Directorate General of Ancient Monuments and Museums. Archaeobotanical work is being funded by the National Endowment for the Humanities. Scott Redford provided the provenience information. He and Mary M. Voigt provided useful comments on an earlier draft of this report. Desirée Martinez and Brett Scaife produced the computer graphics.

characterized by dense woodland.

SAMPLING AND LABORATORY PROCEDURES

In the field, many samples of nearly pure charcoal and seeds were collected by hand and trowel from the Burned Phase of the Crusader fortress. In addition, a number of other Medieval deposits were sampled for flotation. In most cases, 8 liters of sediment were collected and processed in the Euphrates river with a flotation device similar to that described by Watson (1976). All the material was sent to The University Museum, where it is presently being analyzed.

Scott Redford, who analyzed the pottery and other material from the Medieval levels (Redford 1986, 1989), chose the samples reported here to answer specific questions about the archaeological deposits and the use of space. The remains also hint at several aspects of the agricultural economy. A small amount of charcoal from the Medieval period has already been identified (Miller 1987), and a final report on the Medieval seed and charcoal assemblage awaits identification and analysis of more material.

In the laboratory, both flotation and hand-picked samples were sieved ; charcoal fragments greater than 2 mm, seed fragments greater than 1 mm, and all whole seeds and rachis fragments were separated out and recorded. The archaeological material is nearly all charred, though there may be a few mineralized seeds as well. Material was identified with the aid of the author's comparative collection, standard seed manuals, and many of W. van Zeist's excellent publications (see van Zeist and Bakker-Heeres 1985/88 for references).

THE PLANTS (Tables 2 and 3)

Cultigens

Wheat. The most numerous cereal grain in these samples is bread/hard wheat (*Triticum aestivum/durum* (fig. 3a). One deposit (GT 13803 and GT 13806) consisted of the harvested crop plus weed contaminants. The grains are fairly small (about 0.96 to 0.98 g/100 grains). For comparison, charred Neolithic bread/hard wheat from Bouqras and Erbaba averages 1.05 to 1.28 g/100 grains, and from Ramad averages 0.70 to 0.76 g/100 grains (van Zeist and Waterbolk-van Rooijen 1985). Bread/hard wheat, as well as small amounts of emmer (*T. dicoccum*) and einkorn (*T. monococcum*) occur as minor components of many samples.

Barley. The twisted grains indicative of 6-row barley (*Hordeum vulgare* var. *hexasti-*

chum) occur in many samples, but 2-row barley (*H. vulgare* var. *distichum*) may also be present. None of the barley occurs in high densities; rather, it occurs as crop contaminant or mixed in with fuel remains. For example, only 2/3 of the identified cereal grain in the sample containing the most barley is barley the rest is wheat (GT 22663, see below).

Fava bean. The two samples of nearly pure fava beans (*Vicia faba*, fig. 3b) are probably part of the same seed stock, for they come from the same area in the Burnt Phase building complex (GT 13809 and GT 13828; see below). Field beans (*V. faba* var. *equina*), which are usually used as a high quality fodder, are about 10-17 mm (uncharred), and broad beans (*V. faba* var. *major*), which are eaten by people, are about 15-25 mm (uncharred) (Townsend and Guest 1974; Gill and Vear 1980). Since the Gritille fava beans are quite small, less than 11 mm long, it seems likely that the material represents stored fodder. The store was infested with grubs; abot 10 % of the whole beans had grub holes, and many of the individual cotyledons did as well. Some of these holes contained the charred remains of their creators (fig. 3b, upper left).

Vetchling. One nearly pure sample of vetchling (*Lathyrus* sp., fig. 3c) was recovered from the same area of the Burnt Phase as the fava beans (GT 13832). Like the fava beans, these seeds probably come from a store of fodder. Although vetchling can be eaten by humans, it requires special processing to remove the toxins that bring on lathyrism, and is usually grown as a fodder crop (Townsend and Guest 1974; see below).

Other pulses. Lentil (*Lens*), pea (*Pisum*) and chickpea (*Cicer*) are found as minor admixtures in these samples as well. They probably grew as weeds in fields, collected along with crops or incorporated in fodder. Their incidental inclusion in the archaeobotanical assemblage shows taht these types could have been cultivated locally; indeed, all are well known as traditional Middle Eastern foods.

Woody plants

A few seeds of caper (*Capparis*) and *Prosopis* were recovered, as was one grape seed (*Vitis*) and a few possible pistachio (*Pistacia*) shell fragments. Poplar (*Populus*), tamarisk (*Tamarix*), and ash (*Fraxinus*) from one of the flotation samples have been identified. In addition to poplar and tamarisk, pine (*Pinus*), oak (*Quercus*), and possibly buckthorn (*Rhamnus*) have been noted from some of the Medieval hand-picked charcoal samples (Miller 1987). As Willcox (1974) found in the Keban region, pine charcoal occurs first in Medieval deposits; it has not been seen in Chalcolithic through Hellenistic samples (see also Miller 1986).

Weeds

Most of the weed seed types found at Gritille are known from other archaeological sites in the Near East. The most common ones in this assemblage are members of the pea (Fabaceae) and grass (Poaceae) families, especially *Trigonella* and *Lolium*.

Small weed seeds were recovered primarily from the flotation samples, but unfloated samples were not totally devoid of weed seeds. For example, two large crop seed types, vetchling and fava bean, occurred in such high concentrations they were just sampled *en masse*, without processing by flotation. Only a few weed seeds remained, probably because simple sieving by the Medieval inhabitants had removed seed impurities before storage. In fact, it is difficult to explain the presence of tiny poppy seeds in these samples, unless one considers the possibility that the whole fruit case, which is about the same size as the beans, was left in with the cleaned crop.

THE DEPOSITS

Charred botanical materials are abundant in several of the rooms in the Crusader period fortress that had been burned. Charred seed concentrations found in place identify crop storage areas within a room thought to be an animal pen. The provenience of the samples is designated by excavation square (Operation) and stratigraphic unit (locus). The lot number defines the actual unit of excavation. Sample numbers are prefixed "GT"

Above burnt phase (Op. 25/10, locus 47)

Lot 77. Ash layer, thought by excavator to have originally charred in large pyrotechnic features in adjacent operations (GT 6307). Assuming a full 8-liter sample was taken, the deposit seems to have a low density of charred remains, consisting primarily of wood charcoal; cereal grains and fragments comprise most of the rest of the sample. The assemblage is consistent with somewhat scattered hearth/oven residue.

Burnt phase, animal pen? (Op. 25/10, locus 75). Room just inside the fortification wall, with internal subdivisions (fig. 2).

Lot 133. Material in north side of room.

The nearly pure dung ash (unfloated; GT 13815) could be stable litter. Two flotation samples from lot 133 are essentially pure wheat deposits and their contents are virtually identical (GT 13803, GT 13806). The floated deposit was described in the field notes as "dark brown earth with seeds and very little else on top of straw deposit".

Lot 140. Material in south half of room.

Two unfloated samples were analyzed, one a collection of vetchling seeds (GT 13832), the other a collection of fava beans (GT 13828). Lot 140 "contains burnt planks, twigs, clay, and seed", and is therefore presumed to include roofing material (Scott Redford, personal communication); the virtually pure seed samples analyzed here persumably come from material that had been stored in the room before the roof fell.

Lot 130. Directly above lot 140 (material in south side of room; GT 13809); virtually identical to the lower fava bean sample.

Independent of the archaeobotanical evidence, Op. 25/10, locus 75 was thought to be an animal pen (Scott Redford, personal communication). The archaeobotanical evidence supports this interpretation, as fodder seems to have been stored in the structure, and the floor, at least in the north side of the room, was covered with dung.

Burnt phase, roof of "animal pen"? (Op. 25/10, locus 57). Directly above locus 75 "animal pen".

Lot 103. Described in the field notes as consisting of mud brick chunks with "large lumps of charcoal and lime and a lot of brunt pottery and unburnt bone" (GT 8113).

Its composition is quite different from the other locus 75 samples, since it is primarily charcoal. The charcoal seems to be poplar/willow, which is consistent with the interpretation that the deposit consists of fallen roofing material. The roof would have protected the fodder stored in locus 75 "animal pen". The only cultigens are cereals, but one cannot tell from the plans or notes whether the sample was taken from north or south side of room, or from somewhere else. Many of the seeds are glossy and distorted by popping, probably from having been burnt in an intense blaze.

Burnt phase, floor deposit in room north of "animal pen" (Op. 10, locus 58)

Lot 124. Sample consists almost entirely of wood charcoal; three types in approximately equal quantities were noted (Table 4) : Poplar, tamarisk and ash (GT 18875). Since a large proportion of the pieces in the flotation sample are twiglets and small branches, with diameters under 20 mm, this sample could be from a store of firewood. Roofing material is a less likely identification, because of the small diameters; furthermore, the excavator does not mention other construction debris (mud or plaster).

Before burnt phase (Op. 9, locus 90). Oven in room of "animal pen", first occupation phase of the Medieval period.

Lot 190. Sample contains nearly equal amounts of wood seeds (GT 22663). The cultigens consist primarily of barley, but also include wheat and lentil. The density of weed seeds and barley rachis segments is extremely high. Since the sample comes from an oven, it is reasonable to suppose that the wood is the residue of fuel. The seeds may be plausibly

explained in at least two ways, either as the discarded and burnt residue of grain cleaning (Hillman 1984) or as burnt dung (Miller and Smart 1984).

Several points can be made in support of the first interpretation, that the seeds come from grain cleaning debris, which was then tossed in a fire :

1. The density of cultivated grain is low relative to the number of seeds. GT 22663 has a barley density of only 13 grains per liter, a wheat density of 5 per liter, and a total identified cereal density of 18 per liter. The corresponding weed seed : cereal ratio is 6.76. In other words, there are almost 7 weed seeds for each identified cereal grain. In contrast, the density of wheat in a virtually pure crop sample (GT 13806) is about 128 identified cereal grains per liter, and nearly all of it is bread wheat. The ratio of weed seed : cereal is only 0.28.

2. Most of the seeds are much smaller than cereals, and simple sieving (rather than hand-picking) would have separated grain from small impurities. Rodent (?) droppings, too, are a plausible impurity in grain, easily removed by sieving.

3. There is a close correspondence between the sample composition and that described for "fine sievings (smaller than prime grain)" in Hillman's (1984 : 10) chart describing glume wheat crop products. The grain in this sample consists of barley and bread/hard wheat, so there is not an exact analogy. Nevertheless, most of the assemblage consists of seeds smaller than prime grain and there are many barley rachis internodes. This stage of processing frequently occurs just prior to use; in the present day, the debris is commonly fed to animals, especially fowl, or tossed into a fire (Hillman 1984 : 4). The Crusader garrison does not seem to have been engaged in agricultural production (Scott Redford, p.c.), but the residents had to eat. This type of residue is what might be expected in a food preparation context, since fine-sieving, as a household task, occurs towards the end of the grain processing sequence.

Some evidence supports the view that the seeds represent dung fuel residue :

1. The bulk of the flotate consists of charcoal, as expected for the material greater than 2 mm. The flotate less than 2 mm has many charred and some silicified straw fragments; this would be expected of dung fuel, which is frequently mixed with straw. The very high density of barley rachis internodes might also have come from straw and poorly cleaned grain in an animal's diet.

2. The weed seeds come from common fodder plants, some of which are not common in grain fields (e.g., *Carex, Scirpus*); many of the types in GT 22663 are those reported in sheep dung by Bottema (1984). Unfortunately, one cannot directly compare the densities of seeds in modern dung with those from a flotation sample, which, after all, has been mixed with dirt and other debris.

3. Barley, which is more likely than wheat to be grown as a fodder croppredominates

in this sample (cf. Miller 1984).

It is possible that fine sievings were tossed into a fire fueled by wood and dung; this would account for ambiguities in the interpretation.

Before burnt phase (Op. 11, locus 49, oven).

Lot 92. Sample consists primarily of charcoal, though there are a few seeds (GT 9002). The sample also has a lot of ashy dust, which may be the residue of burnt dung. If so, both context and contents suggest that the deposit is easily attributed to fuel (wood and dung).

SUMMARY

There are very few reports that even include Medieval period archaeobotanical remains in the Near East (Samuel 1986, see Miller 1991), though the coming years should bring results of recently completed excavations. The samples reported here are of three general types : stored crops, accidentally burned in the conflagration that destroyed the Crusader-period fortress; material deposited on the floors of the intramural settlement before or during the conflagration (dung in the "animal pen", roof collapse, and/or the remains of stored fuel or furnishings); and concentrated fuel remains found in or near ovens (Table 1).

The deposits from the Burnt Phase represent a "moment in time" over a restricted area. As of this writing, there is no way to tell how representative these remains are for Gritille, let alone for the Medieval period of southern Turkey and northern Mesopotamia generally. The stored crops that have been preserved, especially the fava beans and grass pea, are probably fodder resources, but the occasional cultigen admixtures of pea, lentil, barley, emmer, and einkorn found in these samples suggests that the Medieval inhabitants of Gritille also grew these crops to feed people or animals.

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Table 1. Summary of primary constituents of samples, floated (fl) and unfloated (unfl)

	Op.	Locus	GT no.	fl?	material
Above burnt phase	25/10	47	6307	fl	little material; fuel?
"Animal pen"	25/10	75	13809	unfl	fava beans
"Animal pen"	25/10	75	13815	unfl	burnt dung
"Animal pen"	25/10	75	13828	unfl	fava beans
"Animal pen"	25/10	75	13832	unfl	vetchling
"Animal pen"	25/10	75	13803	fl	wheat
"Animal pen"	25/10	75	13806	fl	wheat
Roof of "animal pen"	25/10	57	8113	fl	charcoal
Room north of "animal pen"	10	58	18875	fl	charcoal
Before burnt phase	9	90	22663	fl	charcoal, seeds, rachis
Before burnt phase	11	49	9002	fl	little material; fuel?

Table 2. Unfloated samples from Gritille

year	1983	1983	1983	1983
GT no.	13809	13815	13828	13832
operation	25/10	25/10	25/10	25/10
locus	75	75	75	75
lot	130	133	140	140
seed (>2 mm; g)	31.39	0.01	81.63	8.14
seed (<2 mm, >1 mm; g)	0.14	0.01	.	.
charcoal (>2 mm; g)	.	.	0.04	0.05
seed (>1 mm; g)	31.53	0.02	9.63	8.14
dung (>2 mm; g)	.	9.39	.	.
CULTIGENS				
Hordeum	.	1	.	.
Triticum cf. *dicoccum*	.	.	.	1
Triticum (est.)	.	1	.	7
Lathyrus (est.)	.	.	.	288
Lens	1	.	4	.
Vicia faba (est.)	168	.	416	.
Pisum (est.)	11	.	12	.
WEEDS				.
Centaurea	.	1	.	.
Papaver	9	.	33	.
Plantago	1	.	.	.
OTHER				
Triticum rachis fragment	.	.	.	1

Table 3. Flotation samples from Gritille

year	1983	1983	1983	1983	1983	1984	1984
GT no.	6307	9002	8113	13803	13806	22663	18875
operation	25/10	11	25/10	25/10	25/10	9	10
locus	47	49	57	75	75	90	58
lot	77	92	103	133	133	190	124
seed (>2 mm; g)	0.10	0.17	0.28	23.61	11.73	1.59	0.03
seed (<2mm, >1 mm; g)	0.03	0.06	0.01	9.07	5.12	0.50	0.10
no. liters sampled*	?	8	8	0.96	0.56	8	8
charcoal (>2 mm; g)	0.67	1.06	3.45	3.07	0.82	2.29	79.91
seed (>1 mm; g)	0.13	0.23	0.29	32.68	16.85	2.09	0.13
dung? (g)	.	.	.	.	.	0.13	.
rodent? droppings (g)	.	.	.	.	.	18	3
CULTIGENS							
Hordeum (est.)	3	4	2	45	16	100	.
Secale	.	1	.	1	.	.	.
Triticum cf. *aestivum/durum* (est.)	.	11	3	1568	938	39	.
Triticum cf. *dicoccum* (est.)	.	.	.	332	48	.	.
Triticum monococcum (est.)	.	.	.	7	19	.	.
Triticum monococcum/dicoccum	.	.	.	10	.	.	.
Triticum sp. (est.)	1	.	.	1068	375	.	2
Cereal (indeterminate; g)	0.03	0.04	0.07	.	0.66	0.12	0.01
Cicer	.	.	.	.	.	2	.
Lathyrus	.	.	.	4	4	.	.
Lens (est.)	3	1	2	29	5	14	.
Fabaceae (large seed)	.	.	.	7	.	.	.
SHRUBS AND WOODY PLANTS							
cf. *Pistacia* (frags; g)	0.02	.	.	.	.	.	.
cf. *Capparis*	.	2	1	.	.	10	.
Prosopis (estimate)	.	.	2	.	.	.	.
Crataegus?	.	.	.	.	1	.	.
Vitis	.	.	.	.	.	1	.
WEEDS†							
Apiaceae, unspec.	.	.	.	.	.	13	.
Centaurea	.	1	.	.	.	2	.
Asteraceae, unspec.	.	.	.	.	.	28	.
Heliotropium	.	4	1	.	.	1	.
Brassicaceae, unspec.	.	.	.	.	.	14	.
Silene	.	.	.	.	.	3	.
Vaccaria	.	.	.	4	1	.	.
Chenopodium	.	.	6	2	.	2	.
Salsola	.	.	.	.	.	1	.
cf. Chenopodiaceae,unspec.	.	.	.	.	.	7	.
cf. *Carex*	.	.	.	.	.	4	.
cf. *Scirpus*	2	3	.	.	.	1	.
Cyperaceae, unspec.	.	2	1	.	.	7	.
Cephalaria	.	.	.	68	63	5	.

Table 3. Flotation samples from Gritille (cont.)

year	1983	1983	1983	1983	1983	1984	1984
GT no.	6307	9002	8113	13803	13806	22663	18875
operation	25/10	11	25/10	25/10	25/10	9	10
locus	47	49	57	75	75	90	58
lot	77	92	103	133	133	190	124
Astragalus	.	.	1	.	.	.	.
Coronilla	.	3	4	3	.	12	.
Trifolium-like	1	2	2	.	.	23	.
Trigonella	1	27	10	.	.	83	.
Fabaceae, unspec.	.	8	1	5	.	74	.
Ajuga	.	.	.	13	3	1	.
cf. *Ziziphora*	.	.	.	.	.	7	.
Lamiaceae, unspec.	.	.	.	.	.	1	.
Papaver	.	.	.	.	.	4	.
Plantago	.	.	.	.	.	2	.
Bromus	.	.	.	.	.	6	.
Eragrostis	.	.	.	2	.	141	.
Eremopyrum	.	.	.	1	.	.	.
Hordeum	.	.	.	.	.	6	.
Lolium	.	.	.	315	186	2	.
Setaria	.	.	.	.	.	2	.
Triticum cf. *boeoticum*	.	.	.	14	23	.	.
Triticum cf. *dicoccoides*	.	.	.	24	.	.	.
Poaceae, unspec.	.	.	14	23	10	217	.
Rumex	.	.	.	.	.	4	.
cf. *Portulaca*	.	.	.	.	.	6	.
Androsace	.	.	.	.	.	2	.
Adonis	1	.	.	2	.	1	.
Galium	.	.	.	12	2	1	.
Valerianella coronata-type	.	.	.	.	.	3	.
unidentified (estimate)	.	17	35	14	.	264	2
OTHER PLANT PARTS							
Hordeum rachis fragment	.	.	4	.	.	100	.
Triticum aestivum/ durum rachis fragments	.	.	2	14	.	50	.
Triticum spikelet forks	.	.	.	3	.	1	.
legume pod frags (equiv. no. seeds?)	.	.	.	8	.	.	.
Vitis? "raisin"	.	.	.	.	.	1	.

*Both GT 13803 and GT 13806 were taken as the standard 8 liter sample. Since they were so large, they were subsampled in the laboratory with the aid of a sample splitter.

†The weed seeds in Table 3 are listed in alphabetical order by family.

Table 4. Charcoal from GT 18875

Type	# analyzed	weight analyzed (g)
Fraxinus	6	6.52
Populus	6	4.77
Tamarix	8	5.47

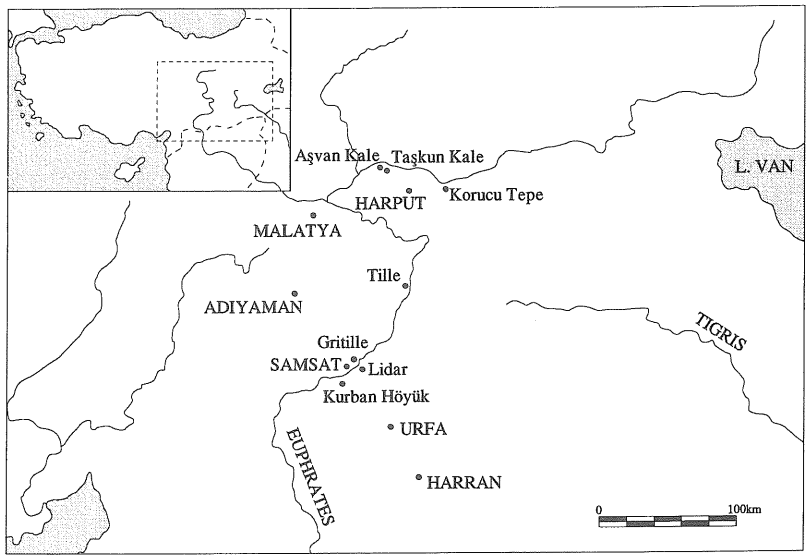

Fig. 1. Map (source: Redford 1986).

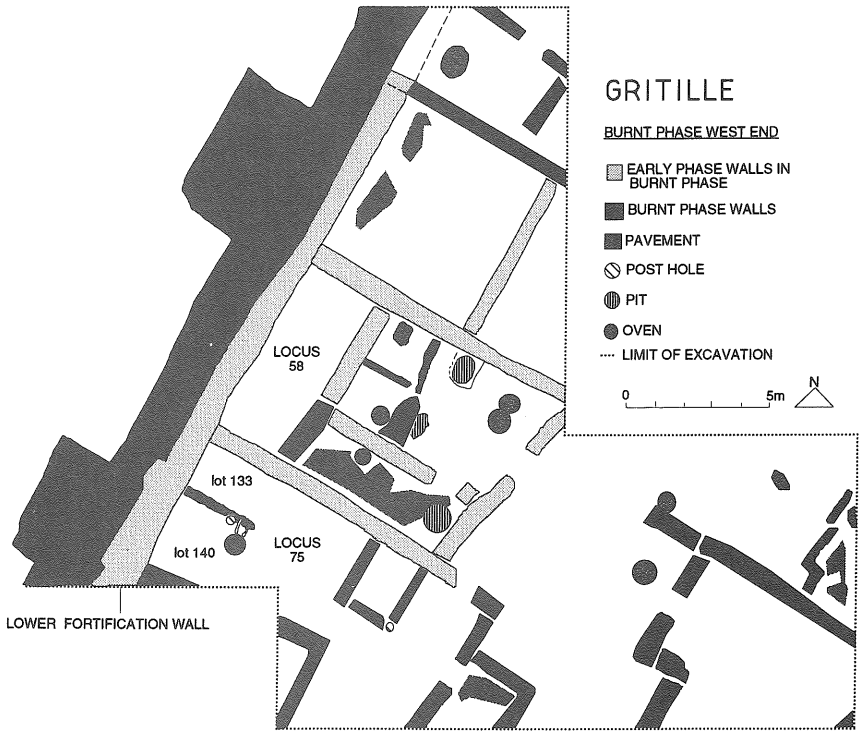

Fig. 2. Gritille Burned Phase showing locus 75 and locus 58 (source: Redford 1986).

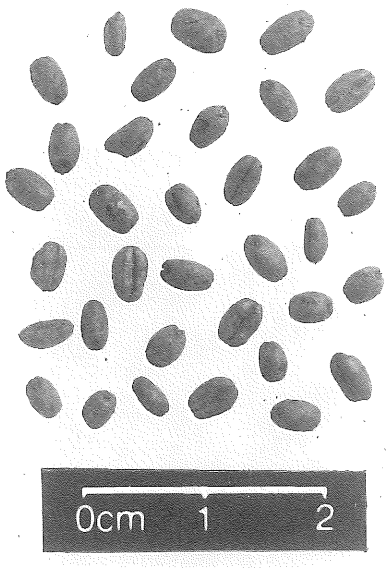

Fig. 3a. *Triticum aestivum/durum* (GT 13803).

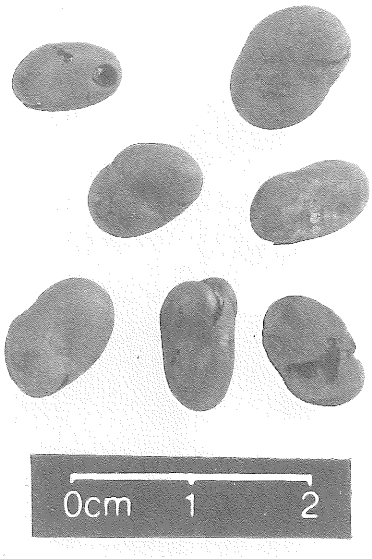

Fig. 3b. *Vicia faba* (GT 13809).

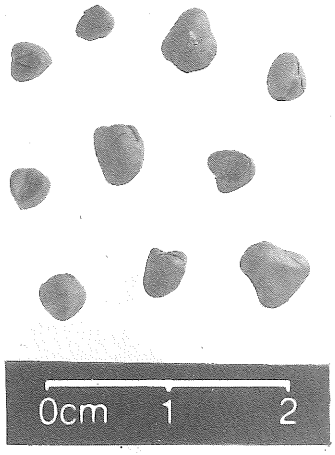

Fig. 3c. *Lathyrus* (GT 13832).