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# **The Aegean in the Neolithic, Chalcolithic and the Early Bronze Age**

**October 13<sup>th</sup> – 19<sup>th</sup> 1997, Urla - İzmir (Turkey)**

**Edited by**

**Hayat Erkanal, Harald Hauptmann,  
Vasif Şahoğlu, Rıza Tuncel**

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## CONTENTS

Abbreviations .....	xi
Preface by the Editors .....	xiii
Opening speech by the Mayor, Bülent BARATALI .....	xxiii
Opening speech by Prof. Dr. Ekrem AKURGAL .....	xxv
Opening speech by Prof. Dr. Christos DOUMAS .....	xxvii
LILIAN ACHEILARA	
Myrina in Prehistoric Times .....	1
VASSILIKI ADRIMI – SISMANI	
Données Récentes Concernant Le Site Préhistorique De Dimini: La Continuité de l’Habitation Littorale depuis le Début du Néolithique Récent jusqu’à la Fin du Bronze Ancien .....	9
IOANNIS ASLANIS	
Frühe Fortifikationssysteme in Griechenland .....	35
PANAGIOTA AYGERINOÜ	
A Flaked-Stone Industry from Mytilene: A Preliminary Report .....	45
ANTHI BATZIOU – EFSTATHIOU	
Kastraki: A New Bronze Age Settlement in Achaea Phthiotis .....	73
MARIO BENZI	
A Forgotten Island: Kalymnos in the Late Neolithic Period .....	85
ÖNDER BİLGİ	
Relations between İkiztepe by the Black Sea Coast and the Aegean World before Iron Age .....	109
TRISTAN CARTER	
Cinnabar and the Cyclades: Body modification and Political Structure in the Late EB I Southern Cyclades .....	119
CHRISTOS DOUMAS	
The Aegean Islands and their Role in the Development of Civilisation .....	131
ANTHI DOVA	
Prehistoric Topography of Lemnos: The Early Bronze Age .....	141
NIKOS EFSTRATIOU	
The Neolithic of the Aegean Islands: A New Picture Emerging .....	159
HAYAT ERKANAL	
Die Neue Forschungen in Bakla Tepe bei İzmir .....	165
HAYAT ERKANAL	
Liman Tepe: A New Light on the Prehistoric Aegean Cultures .....	179
JEANNETTE FORSÉN	
The Asea Valley from the Neolithic Period to the Early Bronze Age .....	191
DAVID H. FRENCH	
Chalcolithic and Early Bronze Age Pottery of Southwest Anatolia .....	197

NOEL GALE	
Metal Sources for Early Bronze Age Troy and the Aegean .....	203
BARTHEL HROUDA	
Zur Chronologie Südwestkleinasiens in der 2. Hälfte des 3. Jahrtausends v. Chr .....	223
HALİME HÜRYILMAZ	
1996 Rettungsgrabungen auf dem Yenibademli Höyük, Gökçeada / Imbros .....	229
ERGUN KAPTAN	
Metallurgical Residues from Late Chalcolithic and Early Bronze Age Liman Tepe .....	243
ANNA KARABATSOLI and LIA KARIMALI	
Etude Comparative Des Industries Lithiques Taillées Du Néolithique Final Et Du Bronze Ancien Egéen : Le Cas De Pefkakia .....	251
NECMİ KARUL	
Flechtwerkgabäude aus Osttrakien .....	263
SİNAN KILIÇ	
The Early Bronze Age Pottery from Northwest Turkey in Light of Results of a Survey around the Marmara Sea .....	275
OURANIA KOUKA	
Zur Struktur der frühbronzezeitlichen insularen Gesellschaften der Nord- und Ostägäis: Ein neues Bild der sogenannten “Trojanischen Kultur” .....	285
NINA KYPARISSI – APOSTOLIKA	
Some Finds of Balkan (or Anatolian) Type in the Neolithic Deposit of Theopetra Cave, Thessaly .....	301
LAURA LABRIOLA	
First Impressions: A Preliminary Account of Matt Impressed Pottery in the Prehistoric Aegean .....	309
ROBERT LAFFINEUR	
Aspects of Early Bronze Age Jewellery in the Aegean .....	323
KYRIAKOS LAMBRIANIDES and NIGEL SPENCER	
The Early Bronze Age Sites of Lesbos and the Madra Çay Delta: New Light on a Discrete Regional Centre of Prehistoric Settlement and Society in the Northeast Aegean .....	333
YUNUS LENGERANLI	
Metallic Mineral Deposits and Occurrences of the Izmir District, Turkey .....	355
EFTALIA MAKRI – SKOTINIOTI and VASSILIKI ADRIMI – SISMANI	
Les Sites Du Neolithique Recent Dans Le Golfe Pagasetique : La Transformation Des Sites De L’age De Bronze En Sites Urbains (Le Cas De Dimini) .....	369
ELSA NIKOLAOU, VASSO RONDİRİ and LIA KARIMALI	
Magoula Orgozinos: A Neolithic Site in Western Thessaly, Greece .....	387
EMEL OYBAK and CAHİT DOĞAN	
Plant Remains from Liman Tepe and Bakla Tepe in the İzmir Region .....	399

DEMETRA PAPACONSTANTINO Looking for ‘Texts’ in the Neolithic Aegean: Space, Place and the Study of Domestic Architecture (Poster summary) .....	407
ATHANASSIOS J. PAPADOPOULOS and SPYRIDOULA KONTORLI – PAPADOPOULOU Some thoughts on the Problem of Relations between the Aegean and Western Greece in the Early Bronze Age .....	411
STRATIS PAPADOPOULOS and DIMITRA MALAMIDOU Limenaria: A Neolithic and Early Bronze Age Settlement at Thasos .....	427
DANIEL J. PULLEN Connecting the Early Bronze I and II Periods in the Aegean .....	447
JEREMY B. RUTTER Anatolian Roots of Early Helladic III Drinking Behaviour .....	461
VASIF ŞAHOĞLU New Evidence for the Relations Between the Izmir Region, the Cyclades and the Greek Mainland during the Third Millennium BC .....	483
ADAMANTIOS SAMPSON From the Mesolithic to the Neolithic: New Data on Aegean Prehistory .....	503
EVANGELIA SKAFIDA Symbols from the Aegean World: The Case of Late Neolithic Figurines and House Models from Thessaly .....	517
PANAGIOTA SOTIRAKOPOULOU The Cyclades, The East Aegean Islands and the Western Asia Minor: Their Relations in the Aegean Late Neolithic and Early Bronze Age .....	533
GEORGIA STRATOULI Soziale und ökonomische Aspekte des Chalkolithikums (spätneolithikum II) in der Ägäis aufgrund alter und neuer Angaben .....	559
GEORGE TOUFEXIS Recent Neolithic Research in the Eastern Thessalian Plain, Greece: A Preliminary Report .....	569
RIZA TUNCEL IRERP Survey Program: New Prehistoric Settlements in the Izmir Region .....	581
HANNELORE VANHAVERBEKE, PIERRE M. VERMEERSCH, INGRID BEULS, BEA de CUPERE and MARC WAELEKENS People of the Höyüks versus People of the Mountains ? .....	593
KOSTAS VOUZAXAKIS An Alternative Suggestion in Archaeological Data Presentations: Neolithic Culture Through the Finds from Volos Archaeological Museum .....	607
Closing Remarks by Prof. Dr Machteld J. MELLINK .....	611
Symposium Programme .....	615
Memories from the Symposium.....	623



# Plant Remains From Liman Tepe and Bakla Tepe in the İzmir Region

Emel OYBAK & Cahit DOĞAN

**ABSTRACT:** Carbonized plant remains from the Late Chalcolithic and the Early Bronze Age levels at Bakla Tepe and Liman Tepe in the İzmir region have been uncovered during the 1996 excavation season. The samples are dominated by cereal grains. At Liman Tepe hulled barley is the main crop with some einkorn wheat and emmer wheat while at Bakla Tepe wheat is predominant. Pulses, such as lentil and vetch, have been found in small numbers. Seeds of rye-grass from each site have also been recorded. Pips of grape and fragments of a fig fruit are noteworthy. The results of our preliminary examination may provide some insight into agricultural practice in Late Chalcolithic and Early Bronze Age times in this part of the Aegean region of Anatolia.

During the 1996 excavation seasons, under the direction of Hayat Erkanal and Armağan Erkanal, carbonized plant remains, mainly seeds and fruits with some tiny wood charcoal, were uncovered from Bakla Tepe at Menderes and Liman Tepe at Urla in the İzmir region of Western Turkey<sup>1</sup> (Fig. 1).

This initial work concentrates on the examination of the charred seeds and fruits recovered from the Late Chalcolithic (c. 4000 BC.) and the Early Bronze Age (c. 3000 BC.) levels of both sites.

The plant remains were collected by manual flotation. Sediments from 10 deposits at Liman Tepe and 109 deposits at Bakla Tepe, including a wide variety of contexts, such as floors, hearths, pits and fills, were sampled.

In Tables 1 and 2 quantitative information on the seeds from the sites are given while in Tables 3 and 4 dimensions of cereal crop types are presented.

## The Plant Remains

### Cereals

-*Hordeum* L. (barley) (Fig. 2 a)

Almost all grains recovered from the two sites are hulled, long and angular or slightly rounded in cross section.

-*Triticum monococcum* L. (einkorn wheat) (Fig. 2 b and c)

Most seeds present single-seeded type characters by having curved dorsal and ventral sides, laterally compressed. Some two-seeded types found have flattened ventral side and pronounced dorsal ridge.

-*Triticum turgidum* L. ssp. *dicoccum* (domesticated emmer wheat) (Fig. 2 d)

The kernels have longitudinally straight or concave ventral sides and distinctly curved dorsal sides.

-*Gramineae* (cereals indet.)

Small fragments of cereal grains

*Legumes*

-*Lens culinaris* Medik. (lentil) (Fig. 2 e)

Lentil seeds are small, strongly flattened, edges angled; 1 to 3.5 mm in diameter.

-*Vicia* L. (vetch) (Fig. 2 f)

Vetch seeds found at Liman Tepe are somewhat compressed; 4 to 7.5 mm wide.

-*Fabaceae* (legumes indet.)

seeds deformed by carbonisation.

### Fruit

-*Vitis vinifera* L. (grape) (Fig. 2 g)

<sup>1</sup> We would like to express our sincerest thanks to the directors of the İzmir Region Excavation and Research Projects (IRERP) excavation team, Prof. Dr. Hayat Erkanal and Prof. Dr. Armağan Erkanal, for encouragement and to other members of the team, especially to Vasif Şahoğlu and Neyir Kolankaya for their valuable cooperation in the study. We are also most grateful to Dr. Mark Nesbitt for comments about the material.

Pips pyriform in shape with a short stalk; the size varies from 5-5.6 x 3.5-4.7 mm.

-*Ficus carica* L. (Fig) (Fig. 2 h)

Fragments of an inflorescence axis found at Bakla Tepe have small drupels (c. 1-1.5 x 0.5-0.7 mm in size).

#### Weeds

-*Galium* L. (bedstraw)

Hemispherical fruit with a round concavity on the ventral side; the size 2 x 2 mm.

-*Lolium* L. (rye-grass) (Fig. 2 i)

The kernels are dorso-ventrally compressed and oblong in outline; the ventral side convex with a pronounced furrow, the dorsal side flat or slightly concave; the sizes 3.3-4 x 1.3-1.9 x 0.7-1.3 mm.

#### Conclusions

Appreciable numbers of grains of crop plants - hulled barley, einkorn and emmer wheat - at Bakla Tepe and Liman Tepe suggest that plant husbandry was of importance there during the 4th millenium BC. In addition, the finds of tools, such as mortars, millstones and flint sickles from the sites recorded by N. Kolankaya supports the idea of crop production and processing.

During the Late Chalcolithic and Early Bronze Age, at Bakla Tepe both einkorn wheat and emmer wheat are predominant whereas barley is less abundantly represented. At Liman Tepe, c. 40 km from Bakla Tepe, on the other hand, barley dominates the spectrum.

Lentil and other legumes may have been used as supplements in the diet of the inhabitants of the sites.

Small quantities of grape and fig may point to the intentional collecting of the fruits for human consumption while the presence of weeds, bedstraw and rye-grass may be due to contamination in the field.

The results from Bakla Tepe and Liman Tepe can be compared with those from the Late Chalcolithic Kuruçay Höyük II near Burdur, some 300 km from the İzmir region. Nesbitt notes the dominance of emmer and einkorn wheat and barley accompanied by legumes. But the Kuruçay legumes include abundant pea and grass pea along with lentil. At our sites, however, both pea and grass pea seem to be absent in our preliminary study.

Similar elements of the crop production dominated by barley and wheat have been recorded in other sites in the Anatolian Aegean region - e.g. Kum Tepe in Çanakkale - and in other parts of Southeast Europe.

Accumulated knowledge of archaeobotany suggests that both barley and wheat were the principal crops of the subsequent spread of agriculture from the Near East nuclear area to the Aegean region and subsequently to the Balkans. Recent archaeological evidence from the İzmir region indicates that prehistoric settlements in the area played an important role in cultural connections between the Anatolia and Southeast Europe. Thus, it would be inferred that the area may also have been a bridge between the both areas in terms of agricultural technology in prehistoric times.

Our archaeobotanical study is at a very early stage. As more information is obtained, a broader picture may be drawn.

#### EMEL OYBAK & CAHİT DOĞAN

Hacettepe University  
Department of Biology  
TR - 06532, Beytepe  
Ankara TURKEY



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**List of Illustrations:**

**Fig. 1:** Location of Bakla Tepe and Liman Tepe

**Fig. 2:** Seeds from Bakla Tepe and Liman Tepe: **a.** hulled barley (Liman Tepe; LCh), **b-c.** einkorn wheat (Bakla Tepe; LCh); **b.** single-seeded, **c.** two-seeded, **d.** emmer wheat (Bakla Tepe; LCh), **e.** lentil (Liman Tepe; LCh), **f.** vetch (Liman Tepe; EB), **g.** grape (Bakla Tepe; LCh), **h.** fig fruit fragments (Bakla Tepe; EB), **i.** rye-grass (Bakla Tepe; LCh).

Table 1. The number of seeds from Bakla Tepe 1996. For Gramineae, only the weight of the fragments is given in grams.

Area	Square	Layer	Depth (cm)	<i>Hordeum</i>	<i>Triticum monococcum</i>	<i>Triticum turgidum</i> subsp. <i>dicoccum</i>	Gramineae (indet.)/gr	<i>Lens</i>	Fabaceae (indet.)	<i>Vitis vinifera</i>	<i>Ficus carica</i>	<i>Gali um</i>	<i>Loli um</i>
H-15	VI-X/c-j	LCh.	58.74-58.67			1							
H-15	I-IV/c-j	LCh.	57.96			3							3
H-15	I-X/a-c	LCh.	59.14-58.77						7				
H-15	II-III/b-c	LCh.	58.96-58.63	2									
H-15	I-IV/a-j	LCh.	57.89-57.75	2	1	3							
H-15	VIII-IX/b-j	LCh.	58.04-57.84		12	73	0.4						2
H-15	I-IV/b-j	LCh.	57.96		4			2					
H-15	VIII-X/d-j	LCh.	58.22-58.14	1	523	551	38	1					150
H-15	V-VIII/e-g	LCh.	58.13	1	3	2			1				
H-15	V-VIII/g-j	LCh.	58.10-58.04		13	10	0.2		1				2
H-15	VI-VII/h-i	LCh.	58.72-58.23			1							
H-15	VII/j	LCh.	57.82	5	64	98	0.2		2				2
H-15	VIII/d	LCh.	57.84		11	68	0.2						
H-15	VIII/e	LCh.	58.34-58.10			1			2				
H-15	X-j	LCh.			72	181							13
E-9		LCh.	59.16-57.61		7	16				1			
F-9	V/e	LCh.	59.93						1				
F-9	I-IX/a-j	LCh.	59.62										2
S-I	XVI/a	LCh.	58.65		3								29
S-I	XVII/a	LCh.	58.45		1	2	0.2		1				4
S-II	II-III/a	LCh.		25		1		1					
S-III	XIX/a	LCh.	54.55	3	1	3	0.2	5					2
S-III	XI/a	LCh.	53.45					20				1	2
F-9	V/f	EBA	59.79	1	2	4	0.2		6				3
H-15	I/a	EBA	58.41		2	4							
H-15	III-IV/a-b	EBA	58.44-57.47		2	8		3	3	1			4
H-15	IV/b	EBA	58.84-57.95	1		1		1					
H-15	X/g	EBA	58.13		7	11							
H-22	I-II/a-e	EBA	53.42-53.33								1		
		<b>Total number</b>		<b>41</b>	<b>728</b>	<b>1042</b>	<b>-</b>	<b>33</b>	<b>24</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>218</b>

Table 2. The number of ancient seeds from Liman Tepe 1996

Area	Square	Layer	Depth (cm)	<i>Hordeum</i>	<i>Triticum monococcum</i>	<i>Triticum turgidum subsp. dicoccum</i>	Gramineae (indet.)	<i>Lens</i>	<i>Vicia</i>	Fabaceae (indet.)	<i>Vitis vinifera</i>	<i>Lolium</i>
U8	I-II/a-e	LCh.	1.06-0.74	111	61	11	36		3	6		10
U7	IX-X/f-k	LCh.	0.83-0.76	47	19	43	25	2		1		1
U7	VIII-X/a-f	LCh.	0.76-0.69	2	2	3	6				1	
U7	X-a	EBA	1.27-0.47	17	2	1	2		2			3
		<b>Total number</b>		<b>177</b>	<b>84</b>	<b>58</b>	<b>69</b>	<b>2</b>	<b>5</b>	<b>7</b>	<b>1</b>	<b>14</b>

Table 3. Dimensions in mm and indices for barley and wheat grains from Bakla Tepe. L=length; W=width; T=thickness; N=number of measured specimens.

	L	W	T	100	
				L:W	W:L
<i>Hordeum</i>					
N=13 min.	4.5	2	1.2		
aver.	5.6	2.8	2	200	50
max.	7	3.75	3		
<i>Triticum monococcum</i>					
N=100 min.	4.5	1.5	1.8		
aver.	5.7	2.2	2.6	259	39
max.	6.5	3	3		
<i>Triticum turgidum ssp. dicoccum</i>					
N=100 min.	5.2	2	2		
aver.	6	2.9	2.6	207	48
max.	7.6	3.6	3		

Table 4. Dimensions in mm and indices for barley and wheat grains from Liman Tepe.

		L	W	T	100	
					L:W	W:L
<i>Hordeum</i>						
n=19	min.	5.2	2.2	1.75		
	aver.	6	2.8	2.13	214	47
	max.	7	3.6	3		
<i>Triticum monococcum</i>						
n=5	min.	5	1.75	2.4		
	aver.	5.5	2	2.7	275	36
	max.	6	2.3	3		
<i>Triticum turgidum ssp. dicoccum</i>						
n=8	min.	4.5	2	2		
	aver.	5.2	2.3	2.5	226	44
	max.	5.75	2.8	3		

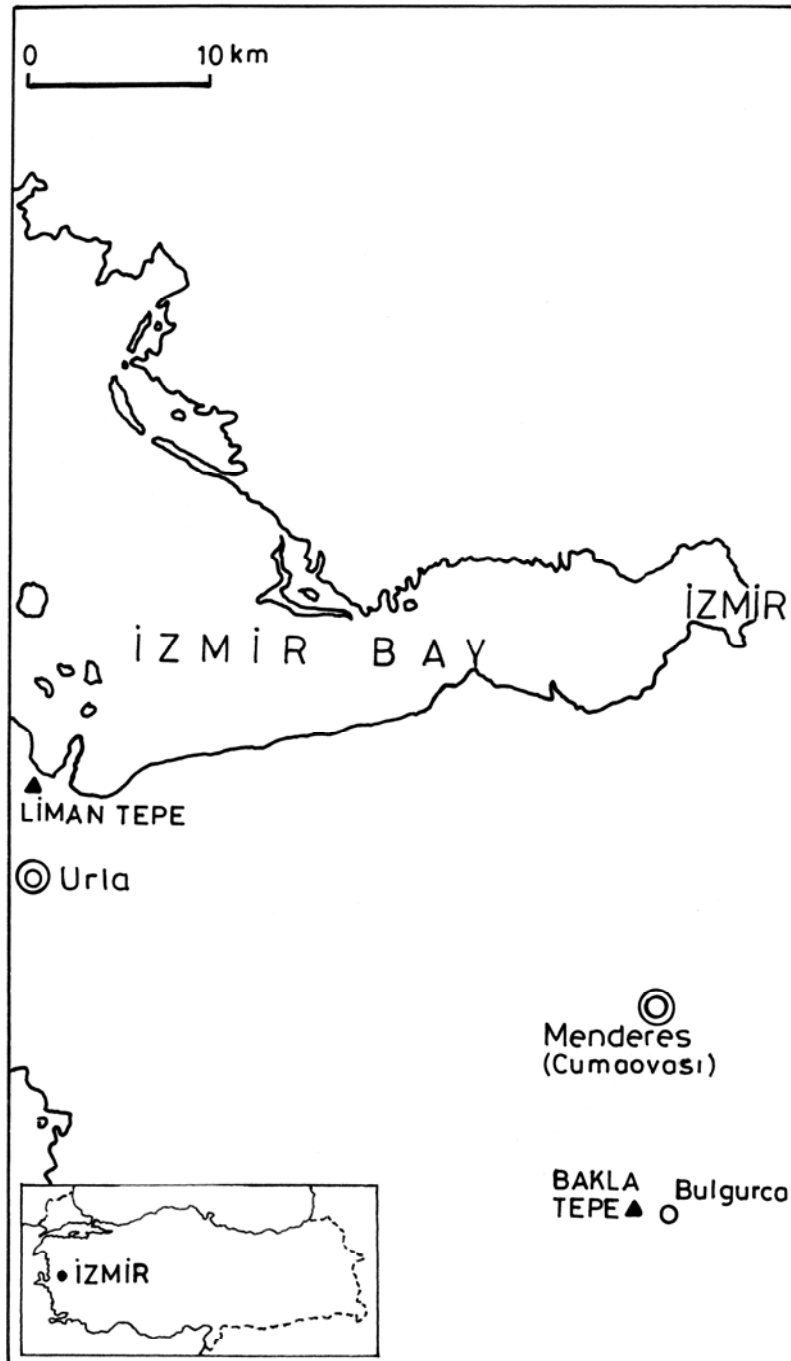


Fig. 1

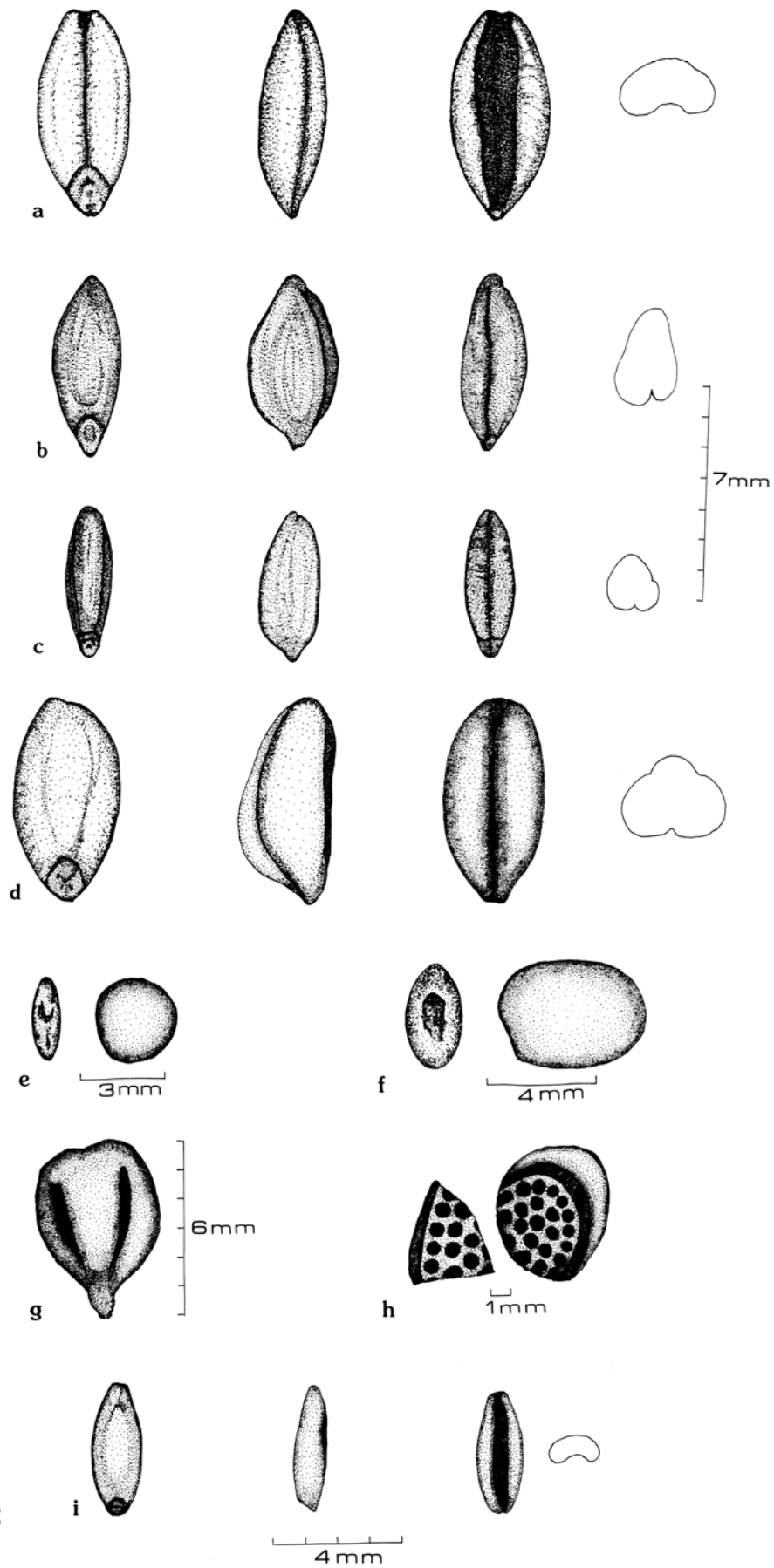


Fig. 2