NEW LIGHT ON EARLY FARMING

Recent Developments in Palaeoethnobotany

Jane Renfrew

editor

Twelve

Carbonised plant remains from Shortughai, Afghanistan

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The study of plant remains from Central Asia, including Afghanistan, has so far been modest in scope. Yet this area is of particular interest. Agricultural societies had emerged in Central Asia by the beginning of the sixth millennium BC, and it is possible that certain farming practices spread from there into the Indian subcontinent. Several wild progenitors of domestic plants occur in the region today and contemporary cultivars are primitive and diverse. Vavilov, who made an extensive study of agriculture in the 1920s, found that many crops had what he considered primitive features, and many exhibited such a wide range of variation that he was led to believe that the region was a centre of diversity for a number of crop plants, including hexaploid wheats (Vavilov 1929).

Central Asian Bronze Age agriculture is characterised by the absence of emmer wheat, while barley (six row hulled) and free-threshing wheats are present, together with millet (*Panicum miliaceum*) (Lisicyna and Priscerpenko 1977). South of the Hindu Kush material has been recovered from Mundigak (Casal 1961, 259) and Deh Morasi Ghundai (Chowdhury 1963, 126), but it is not sufficient to form even a general idea of the economy. Farther east, from India and Pakistan, there is a considerable body of data. Wheat and barley were introduced there at the beginning of the fourth millennium, and at a much later date sorghum and two African millets were introduced either into southern India via the Indian Ocean or to the Indus via the Oman peninsula. Rice was either introduced from farther east or brought into cultivation by the second millennium (Mittre 1977, 569; Kajale 1974; Chowdhury 1951; Allchin 1969, 323).

During the 1978 season at Shortughai samples were taken from the full range of levels, including the early levels with Harappan affinities (late third millennium), and later levels which are Central Asian in character (second millennium), to establish whether agricultural changes occurred and how farming in the region differed from that in the Near East on the one hand and that in India on the other. At a more general level,

sampling was undertaken to establish what the subsistence economy at Shortughai could tell us about the settlement and its inhabitants.

The site is situated on the ancient flood plain of the Amu Darya (Oxus) and is now about 30m above the level of the river. The climate is continental with very cold winters and hot dry summers. The growing season is very short and the rainfall low, about 250mm per annum, but enough for dry farming. Rates of transpiration and evaporation are very high; however, the rains fall mainly in spring and early summer. In the foothills of the Hindu Kush 20km to the south, at a higher elevation, dry farming is more reliable, while in the area of the site, yields are very low in some years. Nevertheless irrigation is not necessarily used for cereal crops, and when wheat and barley crops fail, millet is usually successful because it ripens more quickly. Irrigation is essential for vegetable crops and for green fodder, both of which are important elements in the subsistence economy (for further details on the geography and irrigation of the immediate area see Gentelle 1978).

The flora of the region is typically Irano-Turanian with few exceptions. Low rainfall, extreme temperature variation, and two distinct periods when plant growth is arrested (during the hot dry summer and the cold winter), give rise to steppe vegetation with only a few arborescent species, which have probably been greatly degraded by man. Only along the banks of rivers do tree species thrive, forming gallery forests. Broadly speaking the area around the site falls into three distinct habitats. The gallery forests, which follow the rivers and flood plains, form a climax where *Elaeagnus angustifolia* is dominant, and *Tamarix* sp., *Lycium* sp., *Zygophyllum atriplicoides*, and reeds are common. These species provide timber for building and fuel, and the fruit of *E. angustifolia* is eaten. The underbrush provides good grazing. The second habitat, the steppe, now heavily grazed, is rich in a variety of species of *Astragalus*, *Artemisia*, and *Phlomis*. *Aegilops tauschii*, *A. triuncialis* and *A. crassa* are also common, as are species indicative of over-grazing, for example *Peganum harmala*, *Alhagi camelorum*, and *Prosopis* sp. Of the tree and shrub species all that remain are *Pistacia vera* (protected for its nuts), *Ephedra*, and two species of prostrate *Amygdalus* shrub, which are rare. Higher up the Kokcha valley, *Cercis griffithi*, *Juniperus* sp. and *Crataegus* can be found. On the northern slopes of the Amu Darya valley tree species are better preserved; this appears to result from organised protection. The steppe is grazed in spring and early summer when there is a thick carpet of vegetation, but by the end of June flocks are moved either down on to the stubble of the fields after the harvest or higher into the mountains. The third habitat is cultivated land, where ruderals colonise a wide range of environments. *Aegilops tauschii* is a common weed of wheat fields; less common are stands of *A. crassa* and *A. triuncialis*. Other species of interest to this study include *Hordeum spontaneum*, *Eruca sativa*, *Lolium*

persica, *Secale afghanicum*, and *Avena* spp. The margins of the irrigation canals are populated by certain species which could be useful indicators, if they were present in the archaeological material; for example: *Glycyrrhiza glabra*, *Carex* spp., and *Cynodon dactylon*.

Because today's economy depends on local resources and has been little affected by imported crops and technology from the outside world, it is a useful guide to the agricultural potential of the past. This is assuming of course that no climatic change has taken place. As we have seen, the staple crops of barley and wheat are grown satisfactorily without irrigation; however, in dry years the harvest may be poor. Millet is also grown on non-irrigated land, being better adapted to arid conditions and having a shorter growing season than wheat and barley. Thus during dry years millet can be relied upon when wheat and barley fail. This is also true for rice, which is only grown on the alluvium close to the rivers, relying wholly on a perennial supply of water from the Kokcha and Amu Darya. The principle wheats growing in the area today include several varieties of *Triticum aestivum* and *T. compactum*; both show a very wide range of variation, and in some cases the distinctions, based upon morphological features, between these species break down (Hutchinson 1974, 36). An account of crop plants in Afghanistan is given by Vavilov (1929). Imported wheats include a variety of *T. aestivum* from the Soviet Union, and white wheat from the United States. No tetraploid wheats are indigenous in the region. Six row hulled barley, lentils, and chick peas are also grown.

Oil, historically an important product in the region, is obtained from *Linum usitatissimum*, *Eruca sativa*, *Sesamum indicum*, and *Papaver somniferum*. The first two are often grown together, the latter two only under irrigation. Vegetable crops are irrigated and though not staples, they form an essential part of the subsistence economy. Also irrigated are *Trifolium rasupinatum*, *Melilotus alba*, and *Medicago sativa*, which are grown for fodder. Vines and cucurbits are extensively cultivated, and are irrigated by deep gullies which presumably afford maximum absorption with minimum evaporation and hence less danger of salination. Trees are planted along the banks of irrigation channels or in irrigated orchards for fruit and timber, for example *Morus alba*, *Prunus* spp., *Cydonia oblonga*, *Populus* spp., *Salix* spp., *Platanus orientalis*, *Punica granatum*, *Elaeagnus angustifolia* and *Juglans regia*.

During the 1978 spring season 66 samples were recovered from levels spanning the chronological sequence of the site. They ranged in size from ten to 100k of deposit, and were collected from levels and features where, as far as possible, it was observed that carbonisation had taken place *in situ*. The samples were subjected to water flotation to separate the carbon from the mineral matter. The latter was wet-sieved to 3mm for the collection of artefacts and small animal bones. The carbonised material

Table 12.1 List of identified plants from Shortughai with the exception of charcoal. Absolute numbers of seeds or fragments are given. The periods and levels are in sequence, but within these units samples are not in chronological order.

Period	I						I										I-II						II		
Level	1						2										1						1		
Trench	A						A										BC						F		BC
Sample No.	33	32	31	28	27	26	30	25	24	23	22	21	20	19	16	15	61	60	58	57	56	39	63	62	44
Hordeum vulgare L. emend. LAM	04	02	08	08	26	01	08	05		19		100	100	100	17		100	5	54	28	8	100	100		
H. vulgare (rachis)					03			01		03		08	06				15		27			2	100		
H. spontaneum C Koch. (internode)												01		03					02			04			
Panicum miliaceum L.								10				02	02	03			100	1		09	08	15			
Triticum aestivo/durum	01	01	03	07	84		17	05		07	01	84	71	86		04	31	32	17	09	03	100	23		
Triticum aestivo/durum (glume frags)												05		01		01			12		100	2			
Triticum aestivo/durum (rachis frags)				10								13	02	06	03		04					100	10		
Lens culinare Medicus		02	01			02						05		01					16	01		09	01		
Pisum sativum L.				01	01																	10			
Prosopis sp.																							03		
Medicago/Astragalus/Melilotus	10	01	30					45		11					03		15				38	06			02
Other legumes				01			01					57	25	63								01			
Echinochloa crusgalli (L) P. Beauv.															02										
Setaria viridis (L) P. Beauv.		02			05																				
Millet type															01										
Aegilops tauschii Coss.			01		03					03		06	05	39		07	68	12	08	01		31			
Avena spp.												04	02	01			02		04			05			
Lolium spp.					01							02	03				04		03		02	08			
Bromus sp.																	03		01						
Agroypyron sp.				01									01				24								
Other Gramineae					02							01	13				01		02			13			
Galium spp.													01	02					03			02			
Compositae										01		03	02	01		01				01			01	02	
Tribulus sp.																									
Caryophyllaceae													07	01											
Polygonaceae																									
Onobrychis sp.								01							01				01						
Boraginaceae											02	01		01											
Cruciferae													02	01		01			07						
Cyperaceae			02		16		02					44	04	08		01			08						
Pistacia vera L.					04							06	01	02		05			09			02			
Elaeagnus angustifolia L.												04				01			01						
Amygdalus sp.																									
Vitis vinifera L.							01						59	11	04	01	02		24		01	02			
Linum sp.													03												

which floated to the surface was swept over a weir into a series of sieves by the flow of the water. Care was taken to avoid breakage of delicate remains such as spikelet and rachis fragments from the cereals. Sieves with mesh diametres of three millimetres, one millimetre, and three hundred microns were used. The finest sieve proved difficult as it tended to clog with fine mineral matter. (For further description of this method see Williams 1973). The carbon was then gently washed and allowed to

Table 12.1 List of identified plants from Shortughai with the exception of charcoal. Absolute numbers of seeds or fragments are given. The periods and levels are in sequence, but within these units samples are not in chronological order.

II										II		III																IV						
3									4	4		1	2	2		3												1						
A									BC	A		AB	B	BC		BB												AB	B		BC			
24	18	17	14	12	11	10	7	6	5	65	9	4	3	2	1	8	55	54	43	35	64	59	52	51	48	46	44	41	40	38	36	53	55	47	42	37	34	
10		37		57	02	31	27	02		100		31	06	30	04			19	12	18	100	30	100	100	13	08	03	25	29	100		100		09	15	08	25	*Hor.*
					05		02			04					03						28		47	100	3	01					100					03	*Hor.*
																					02		06			01					02						*Hor.*
?				11		19	37			31	100										06	01	04			36	07	01	43	02	100				04	100	13	*Pan.*
03		10		37	03	15	10			12	20		13	04	48			04	05	01	01	13		02	100	7	06		09	08	30		03	04	05	04	02	08	*Tri.*
		01				01				02			03	02				02						100	1	01						02						*Tri.*
					01	09	02	08		01			06	02		04	03				03			100	6			04				02	04			05	07	*Tri.*
										02								03			09	01	02	02							01			01	04	01	*Lens*
		01								07					01									03					01		03						*Pis.*
							01																19								01	09					*Pro.*
		01		06	02	13	37	01	05	22		14	24				08				13	04			12	03		08	02	22						05	*Med.*
										01											02		03								09			02		leg.
					01	05					03						05																			02	*Ech.*
					01		02															01			01											*Set.*
																																03			02	Mil.
				02						36	02			03				05	03	01	03	01	02	01					02		13				01	*Aeg.*
																													03							*Ave.*
					03				03	05	03						01		01				03				04									*Lol.*
												03											02													*Bro.*
																					02		13													*Agr.*
					02					04											01		02													Gra.
				01			01		01	06	03						01				05			02										01		*Gal.*
					02																			01												Com.
										01																										*Tri.*
							01		01																											Car.
													02																						02	Pol.
																							02								03					*Ono.*
					03												01											08								Bor.
										01											02					01										Cru.
		01		23		12			08	32		08											04			01										Cyp.
		04			02	07				01								02													01				03	*Pis.*
			01			01																01														*Ela.*
													04																							*Amy.*
		02		04		01	04		05	01			15													01	01	01									*Vitis*
																																				Lin.

dry slowly prior to sorting under a binocular microscope. When critical material was found to be in a fragile state, it was consolidated with a solution of HMG cellulose nitrate resin in acetone. There is little doubt that both retrieval and processing of samples was selective, but no more so than the fortuitous circumstances of carbonisation and preservation. It is therefore necessary to accept these limitations and view the results of identification accordingly. The range and volume of the material sampled

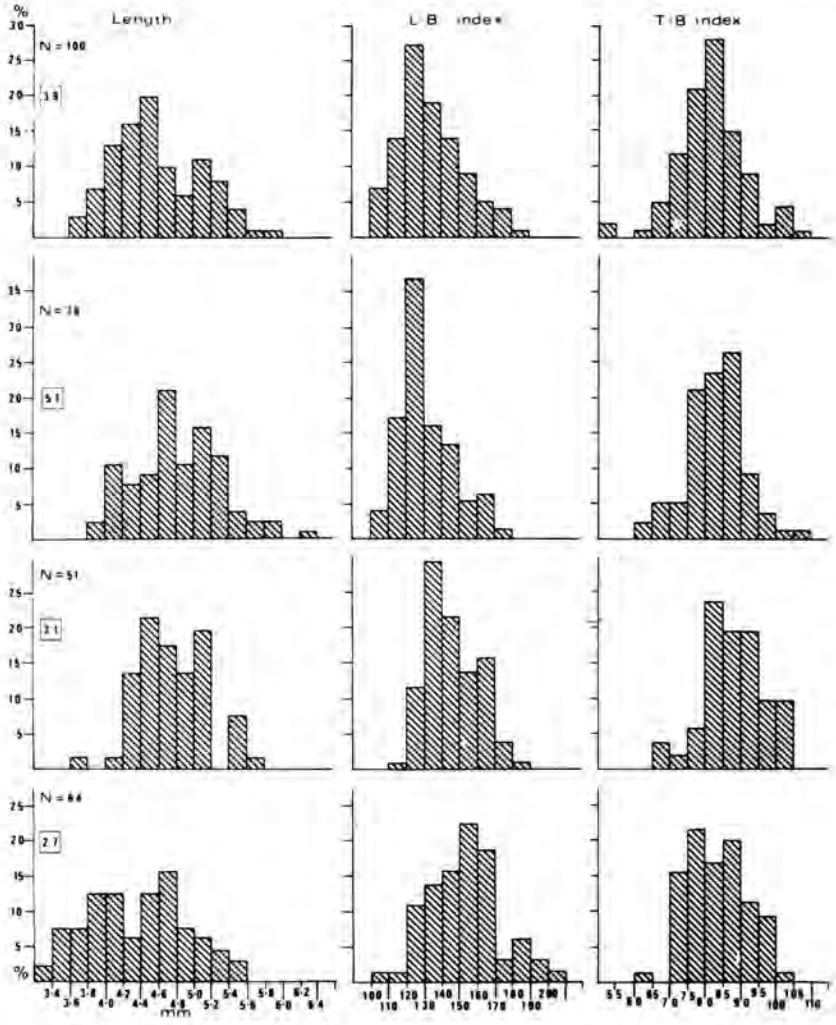

Figure 12.1 Histograms showing frequency distributions of wheat grains from four separate samples.

may help to iron out some of these irregularities.

A brief survey of the extant flora of the region was also carried out, but limited to those species of archaeobotanical significance, which were collected for a comparative reference collection. However, owing to the wide range of species in this botanically rather poorly known region, identification of non-cultivated carbonised plant material is to family or generic levels only.

Table 12.1 gives the list of the plants identified. Samples are divided

according to phase, but are not in chronological sequence within the phases. Plant remains from Shortughai were found to be in an excellent state of preservation even to the point of recovering awn and glume fragments. *Hordeum vulgare*, six row hulled barley, was the most common crop numerically but on the basis of presence analysis it is not very different from wheat. So similar are their distributions that one might be led to believe that they were grown as a single crop. However this is improbable because they would not ripen simultaneously, making harvesting difficult. Furthermore, we find that millet, an even more incompatible (summer) crop, follows the same distribution. This mixture of crop plants presumably occurred after crop processing. *Hordeum spontaneum* occurs frequently and may represent a persistent weed which is still seen in this region today. Barley recovered from Indian sites is normally six rowed, but both naked and hulled forms occur. The presence of six rowed forms in Central Asia shows divergence from the Near East, where two row hulled barley occurs, while six rowed forms are a feature of European agriculture during this period (Hubbard 1980, 63). Rachis material indicated that both lax and dense-eared forms were present. Another important crop of the Shortughai economy, which occurs commonly in Europe and rarely in the Near East, is *Panicum miliaceum* (Hubbard 1980, 62). It has not been found on Harappan sites, and as can be seen in Table 12.1, it appears to be absent from the earliest levels at Shortughai. As mentioned below this species of millet is resistent to drought. It was used in Central Asia (Olufsen 1911, 496) by the poor, roasted like coffee beans and eaten in this form. Nomads occasionally grow it, presumably because it can be easily transported.

Triticum aestivo/durum was recovered in various forms, i.e., glumes, rachis, and grains. Metrical analyses which indicate considerable morphological variation are given in Figures 12.1 and 12.2. The grains from Shortughai fall into three, possibly four, groups on the basis of the measurements taken (see Figure 12.3), and the proportions of these groups vary from sample to sample.

Similarly there is a variation of internode length and robustness of the rachides (see Figure 12.5). Glumes are also variable; some are robust and strongly keeled in the upper portion ending at a pronounced shoulder, while others are more fragile, with a less distinct shoulder (see Figure 12.4).

The contemporary distribution of wheats in Afghanistan is significant. For example, there are no native tetraploids, while the range of *T. aestivum* and *T. compactum* is huge. Vavilov (1929) collected 60 varieties of the former and 50 of the latter, which led him to call Afghanistan a centre of diversity (Vavilov 1951, 31). *Aegilops tauschii* occurs commonly as a weed of wheat fields, particularly in the north, and according to Peterson (1965, 91), hybrids can occur naturally in wheat fields. The

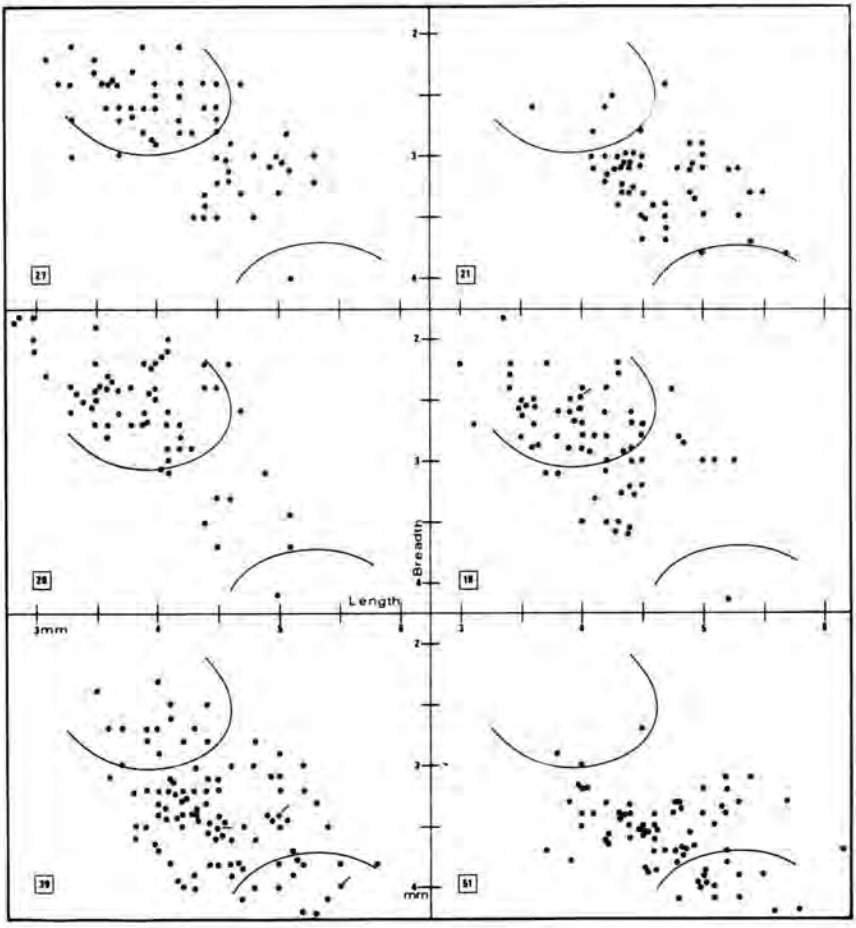

Figure 12.2 Scatter diagrams based on length and breadth measurements of wheat grains from Shortughai.

archaeological evidence does not contradict the modern situation. Even early Djeitun sites lack tetraploids. At Mundigak *compactum* was identified. Nearby at Deh Morasi Ghundai (Chowdhury 1963, 126) *A. tauschii* was found as a weed, outside its natural area of distribution. In India from the same period *T. aestivum*, *T. compactum*, and *T. sphaerococcum* were identified (Sankalia 1974; Kajale 1974). However, not one report includes details of spikelet morphology, and only in some cases, measurements of grains. Given the array of varieties found in the region today the usual distinctions between forms break down because intermediates occur (Hutchinson 1974, 36). This being the case one cannot justify at this stage any taxonomic division when examining the ancient material. In fact, grains are usually compacted while the rachis is comparable to various forms of *T. aestivum*. This is not the first time

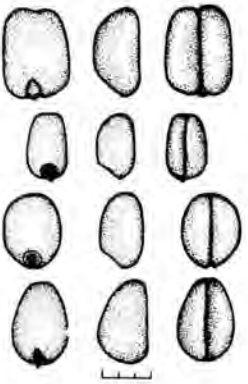

Figure 12.3 Typical examples of the different forms of wheat grains. The grains illustrated are indicated by a line in figure 12.2.

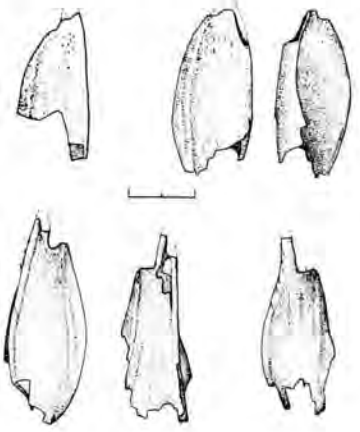

Figure 12.4 Wheat glumes. Above, delicate form with less pronounced shoulder; below, robust form with stronger keel and notched shoulder.

obviously related material contradicts itself; similar finds have come from Iran and Europe (Hubbard pers. comm.).

Variation in the proportion of these different morphological groups is not constant in the samples. Two groups can be seen clearly in sample 27 (see Figure 12.2), yet one of these groups dominates sample 21, the other, sample 20. Sample 39 came from a large rubbish pit with a number of different horizons; not surprisingly we find a mixture. The evidence from samples 20 and 21 suggests the crops were cultivated separately; perhaps one variety was suitable for dry-farming, the other being better adapted to irrigated conditions. The large square grains (see Figure 12.3), which may relate to the robust rachides and glumes, appear at the period

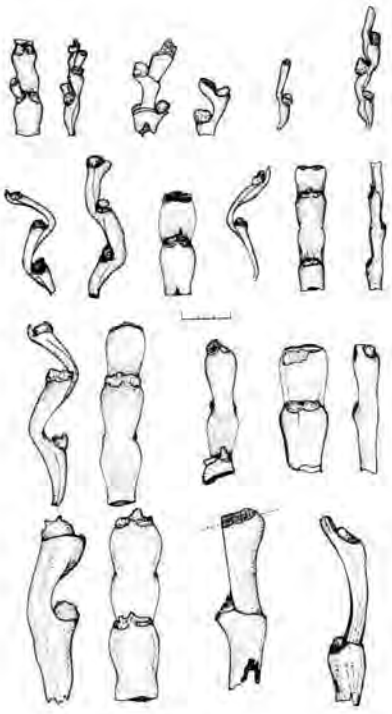

Figure 12.5 Rachis fragments of wheat from various samples, to show the wide range of forms present.

one/two interface, but do not occur on mound A, only on mound B; this may imply cultural division, though it can by no means be proved. Finally the problem of separating *T. durum* from *T. aestivum* from these carbonised remains has not yet been resolved. The glumes lack their bases and the rachis material does not alone provide definite criteria. On the basis of the modern evidence of the distribution of wheats one would expect *T. aestivum* rather than *T. durum*. The diversity of hexaploid genotypes in the region can be explained, first, by their continual association with *A. tauschii*, second, by the isolation of communities, which has led to the survival of recessive characteristics such as liguleless wheat, and third, by the occasional exchange between widely separated societies.

Lentils (*Lens culinaris*) were an important part of the diet at Shortughai, and were present in every period. They occur in India by the end of the third millennium (Kajale 1977, 818) and in Swat at about the same time (Constantini 1977, 27-30).

Peas (*Pisum sativum*) were also relatively common throughout the occupation of the site. They are a ubiquitous species for the prehistory of

Asia and Europe. Measurements are given below:

Widest diameter
Max. 6.0mm
Min. 2.8mm N=26
Ave. 4.4mm

Other legumes of economic importance include a group which could not be precisely identified owing to the wide range of unknown species with similar seeds which grow in the area. This group includes members of the following genera: *Medicago*, *Astragalus*, *Melilotus*, and *Trifolium*. The first, which closely resembles *M. sativa* was by far the most common. From the evidence it is clear that these plants were utilised and are not incidental ruderals from cultivated fields. However the data does not show conclusively that these plants were cultivated; it is possible that they were gathered. If this was the case, they would have to have been gathered during the very short spring season, and stored as fodder for the lean months. It seems more probable that the crop was grown in irrigated fields to provide green fodder through much of the year. The archaeobotanical history of fodder crops including *Medicago sativa* is not well understood. It is believed that horsemen from north-east Iran and Central Asia (Simmonds 1976, 166) first brought the plant into cultivation during the second millennium, and the crop spread as these first horsemen moved west, but there is no concrete archaeobotanical evidence to support this. Shortughai is the first to have produced possible evidence to support this theory. The fact that *Medicago sativa* is extremely well suited to irrigation in hot semi-arid regions is more important in terms of its development as a crop plant than its association with the horse.

Pistacia vera was common throughout the duration of the site and was presumably gathered from the wild as indeed it is today in the area. Fruits of *Elaeagnus angustifolia* (oleaster) (see Figure 12.6) and *Amygdalus* sp. (almond) were also gathered from the wild. The latter was only found in one sample. Grape seeds (*Vitis vinifera*) were the most common fruit found and are of a small-seeded variety, only a little larger than wild specimens (see Figure 12.7). Finds of domestic vine occur in Europe at least as early as the fourth millennium BC, but they appear to have spread slowly east, only reaching Iran by about 1000 BC (Renfrew 1973, 127). They have been found in the Middle Bronze Age in Central Asia (Masson 1972, 11) and at Loebanr III, 2300-1500 BC, in the Swat Valley (Constantini 1977a and b). This evidence, with that from Shortughai, suggests the possibility of independent domestication of the vine in this area.

Oil seed crops are represented by *Linum usitatissimum*. This plant was identified from impressions in mud brick (not shown in Table 12.1).

The remaining seeds recovered from Shortughai not discussed above

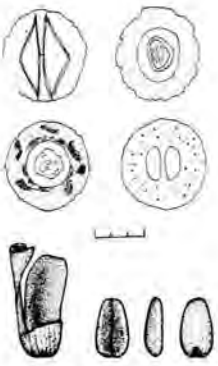

Figure 12.6 Above scale, sections through stones of: above left, *Ziziphus jujuba*; above right, *Olea europea*; below left, *Elaeagnus angustifolia*; below right, *Cornus mas*. (Relying on external features can only lead to confusion; below scale, internode and grain of *Aegilops tauschii*).

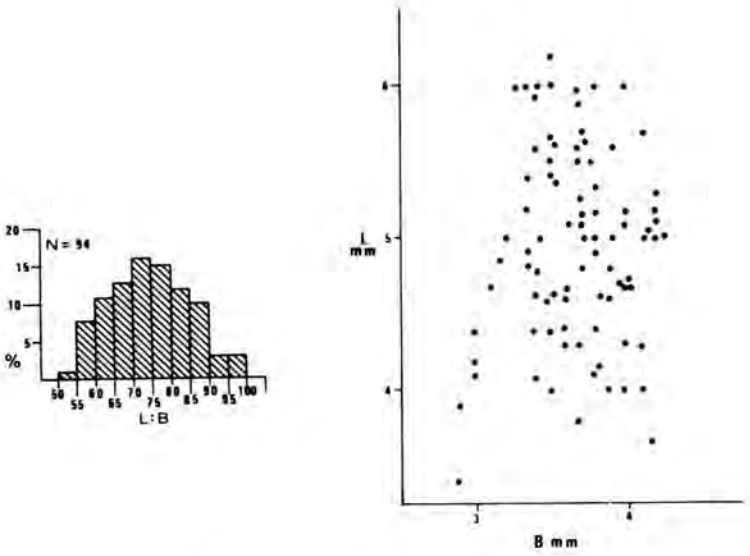

Figure 12.7 Left: histogram giving frequency distribution of length:breadth index of *Vitis vinifera*. Right: scatter diagram of length and breadth measurements.

are ruderals, which thrive in a wide range of habitats, and are most easily explained as contaminants of cultivated crops. Few were readily identifiable. Of particular interest is the presence of *Aegilops tauschii*, which in some samples is very numerous (see Table 12.1). This species contributed to the development of hexaploid wheats and may explain the

diversity of hexaploids and the absence of tetraploids. The Cyperaceae are possible indicators of irrigation. If this is the case, it is significant that they are rare in periods III and IV.

Finds of carbonised wood from flotation samples and from fragments collected by hand during excavations were identified and compared with reference specimens collected from the general area. It has been shown that analysis of charcoal from archaeological sites can be useful in reconstructing past environments (Willcox 1974). The inhabitants of Shortughai utilised the gallery forest which followed the Amu Darya. *Elaeagnus angustifolia, Tamarix* sp., *Salix* sp., *Populus* sp., and *Lycium* sp. are all very common and formed the main source of fuel. *Pistacia vera* and *Amygdalus* sp. are the only representatives of steppe flora. Pistachio is common and must have been a more important element in the steppe flora than today, when it is only found in small protected stands 10km to the south. Analysis of charcoal from Greek levels at Ai Khanoum (Willcox 1979) where the gallery forest must have been less extensive, shows that steppe species are more frequent, and we find *Celtis* sp., *Crataegus* sp., and *Juniperus* sp., in addition to *Amygdalus* sp. and pistachio. According to the evidence from the two sites the surrounding steppe has been partly denuded of its tree and shrub species. However the tree cover was probably never very dense, especially in view of the fact that the inhabitants of Shortughai went to the gallery forest to collect the major portion of their fuel.

The carbonised plant remains from Shortughai are unique evidence of Central Asian prehistoric agriculture, unique because this is the only site which has been sufficiently sampled, and so as yet has few parallels from this region. Archaeological evidence indicates that the early phases at Shortughai are culturally Harappan. The archaeobotanical evidence, however, indicates that agriculture on the Ai Khanoum plain was already adapted to this particular environment and shows few affinities with that found in the Indus Valley. This is not surprising, as the two regions offer very different environments for agriculture and therefore require different farming techniques and different crops. While there is archaeological evidence for cultural change during the occupation of Shortughai, there is no significant change in the subsistence economy. In all probability the agricultural regime was a static element in the history of the Ai Khanoum plain, being strictly controlled by the natural parameters of the environment. If this is the case, it implies a balanced economy within the ecosystem. The three major habitats discussed offer a good economic potential with a high degree of reliability, despite the apparent harshness of the environment. The broad gallery forest offers a large renewable supply of fuel, timber, and good grazing. The plain, with its artificial but above all constant supply of water, offers a large area for irrigated farming, which can be supplemented by dry-farming on higher

ground. The foothills are also suitable for dry-farming, and provide seasonal grazing. Irrigated lands alone offer only a limited area, and hence little room for an expanding population. With the addition of dry-farming for cereal crops the agricultural capacity becomes much greater.

The proportion of barley to wheat tends to be higher in the later levels (see Table 12.1). Similarly, millet becomes slightly more frequent while at the same time there are fewer seeds belonging to members of the Cyperaceae. This does not imply that irrigation was less important, but more probably that there was more reliance on dry-farming. Also during the later periods it appears that the large square-grain wheats replaced the smaller, more slender wheats, for example, in sample 27 (see Figure 12.2). It is possible that different varieties of wheat were used for dry-farming; the variation apparently results from genetic rather than environmental factors.

On a broader level, the evidence from Shortughai does not contradict evidence, scarce as it is, from other sites in Central Asia, either north or south of the Hindu Kush. Features such as the cultivation of millet, the presence of six row hulled barley, the absence of emmer, the apparent substitution of lucerne for bitter vetch as a fodder crop, and the lack of chick peas, indicate an economy suited to the local environment, differing from sites in either the Near East, Europe, or India. While influences from both east and west affected the material culture of the Ai Khanoun plain, the subsistence economy continued to remain independent of cultural factors. The natural environment provided a limiting framework for the agricultural system, which exhibited certain regional traits, also to be seen in the present-day traditional agriculture. This supports the theory that agricultural systems change very little, because of environmental restrictions, and that regional traits in contemporary traditional agriculture are often seen also in the prehistoric record.

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