

Some seed and fruit remains from Kausambi, District Allahabad, U.P. (ca 600 B.C. - 450 B.C.)

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Archaeobotanical investigations at Kausambi, an ancient site on the left bank of the river Yamuna in Allahabad District of Uttar Pradesh, have revealed the cultivation of barley, bread-wheat, field-pea and cotton dating back to ca 600 B.C. Amongst the wild taxa silk-cotton seeds and fruit-stone pieces of jujube have also been recovered. The morphological studies of the ancient plant remains along with their archaeological significance have been discussed.

Key-words - Archaeobotany, Kausambi, India.

INTRODUCTION

THE ruins of Kausambi (81°23' N Lat., 25° 20' E Long.) are situated on the left bank of the river Yamuna at a distance of 51.2 kms south-west of Allahabad. This site in the gangetic plain in northern India was a great urban centre in the early historical period. The excavations at this site were carried out by Prof. G.R. Sharma of the Department of Ancient History, Culture and Archaeology, University of Allahabad during 1957-59 (Sharma, G.R. 1960) among which Northern black polished ware is the main pottery type associated with the Ganges Civilization. It goes back to Circa sixth century B.C. (Lal 1982).

The samples of carbonised material sent by the excavator to the Tata Institute of Fundamental Research, Bombay for C14 dating, were made available by Late Dr. Vishnu Mittre for botanical study. Attempts were made

to recover wood charcoal fragments from the organic material of 20 samples, whatever left in them after being consumed away for dating purposes. Luckily in the remains of 4 samples, some seeds and fruits were encountered as an incidental inclusion in the wood charcoal contents. They have been found as belonging to the cereals of *Hordeum vulgare* (barley) and *Triticum aestivum* (bread-wheat), pulse of *Pisum arvense* (field-pea), fibre yielding crop of *Gossypium arboreum/herbaceum* (cotton); amongst the wild taxa seeds of *Ziziphus nummularia* (jujube) and *Salmalia malabarica* (silk-cotton tree) have been found. The details of the finds have been given in table-1.

MATERIAL AND METHODS

Seed and fruit remains were segregated from the samples of wood charcoals under stereobinocular

Table 1: Seed and fruit remains from Kausambi

Sample No.	Field No.	Site	Depth	Locus	Stratum	Pd. & Culture	Age	Identity
TF--225 AU/K-136	KSB/63/GR-136	KSB-G/R-YZ-3	5'6"	1-2	11	III-NBP	405 ± 108 B.C.	<i>Salmalia malabarica</i>
TF--232 AU/K-112	KSB/63/GR-112	KSB-G/R-YZ-2	11'4"	1-3	26BK	III-NBP	-	<i>Gossypium arboreum/ herbaceum, Hordeum vulgare</i>
TF--233 AU/K-113	KSB/63/GR-113	KSB-G/R-YZ-2	11'7"	1-3	27 BK	III-NBP	-	<i>Pisum arvense, Triticum aestivum</i>
TF-235 AU/K-131	KSB/63/GR-131	KSB-G/R-YZ-4	5'4"	1-2	16 BK	III-NBP	-	<i>Ziziphus nummularia</i>

microscope and were cleaned with 5% glacial acetic acid keeping in it for 5-10 minutes, followed by repeated washing in water. Mud particles adhered to the surface of seed and fruit remains were further cleaned in acid-alcohol (Glacial Acetic Acid 10% + Ethyl Alcohol 50% in equal volumes) with the help of a soft camel-hair brush. Finally, the grains were left to be dried up in air.

OBSERVATIONS

The material of study comprises a few complete and broken graminaceous grains, leguminous and fibre crop seeds, and seed and fruit remains of wild taxa. The results of study have been grouped under different heads as given below:

A. Cereals

Wheat (Fig. 1): Single grain is somewhat elongated, narrower towards both ends and slightly broader in the middle. The dorsal side is smooth and slightly raised. The ventral furrow running end to end is slightly curved and somewhat deeper in the middle. It measures 4.50 mm in length, 3.00 mm in breadth and 1.50 mm in thickness. Hilum is steeply placed on the dorsal side. It

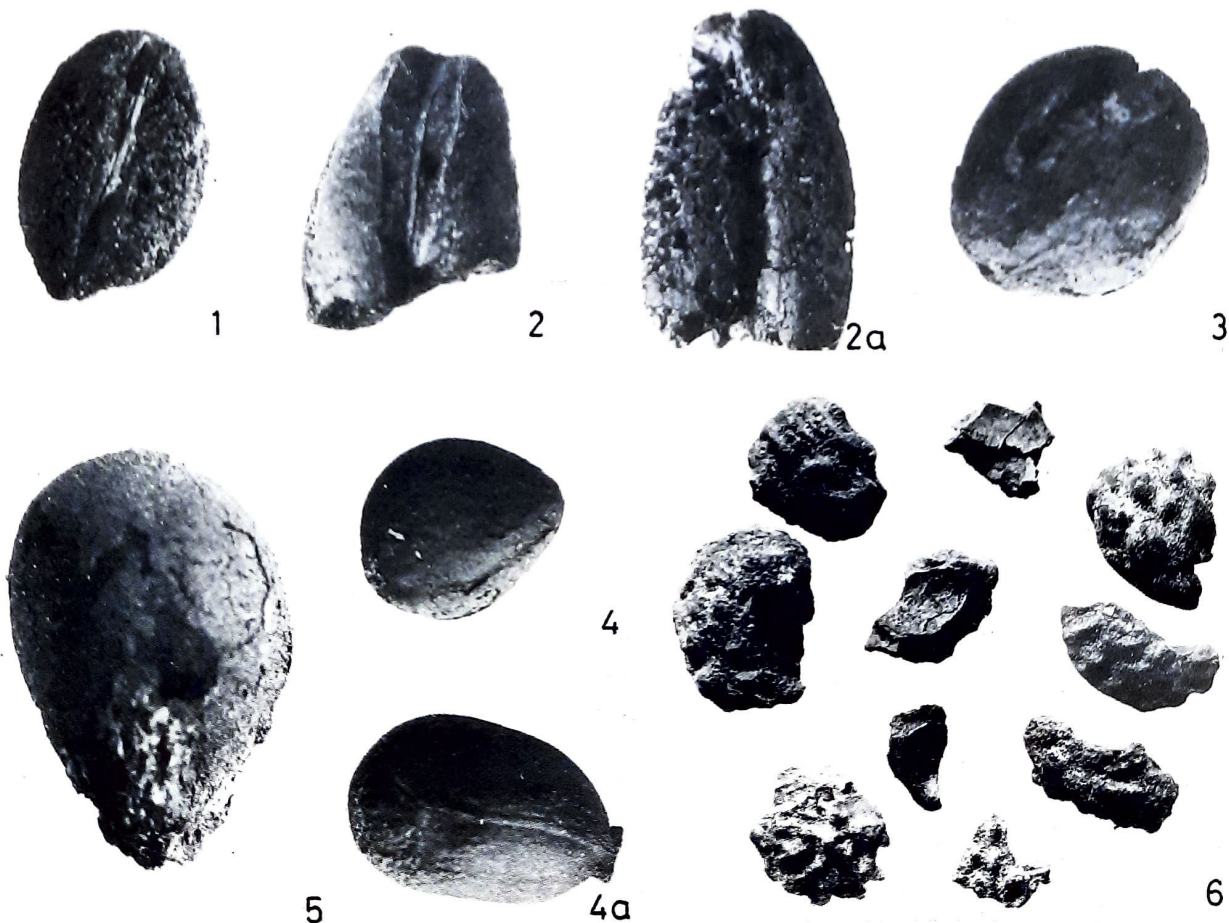
resembles in all morphological characters to that of hexaploid bread-wheat (*Triticum aestivum*) (L.) emend. Thell.

Barley (Fig. 2,2a): The two broken grains measuring 3.00 to 4.50 mm in length and 2.75 to 3.00 mm in breadth, 1.75 to 2.00 mm in thickness have a longitudinal furrow on their ventral side. The furrow originates from the base and gradually widens towards the upper end of the grain. Longitudinal striations are seen on the husk covering the grain. The morphological features of these grains bring them close to the hulled species of barley.

The ancient barley grain from Kausambi exhibits no distinct twists on it being very few in number and incomplete, it is not possible to refer it to two-rowed or six-rowed form of hulled barley. The Kausambi barley has, therefore, been placed under the hulled, *Hordeum vulgare* L. emend. Bowden, a cultivated species.

B. Legume

Field-Pea Seed (Fig. 3): The carbonised seed measuring 4.50 mm in length, 3.50 mm in breadth and 3.00 mm in thickness, is almost spherical in shape. Seed surface



Figures 1-6. Seed and fruit remains from Kausambi, Uttar Pradesh. 1. Bread-wheat grain in ventral view x 8; 2. Barley grain-ventral view showing the furrow expansion part x 10; 2a. Barley grain-ventral view showing basal furrow part x 10; 3. Field-pea seed x 8; 4. Simal seeds x 7; 4a. Modern simal seed x 6; 5. Cotton seed x 10; 6. Jujube fruit-stone pieces x 4.

is smooth. Hilum scar is well preserved. It has been referred to *Pisum arvense* (L.) Poir.

C. Cotton Seed

Cotton (Fig. 5): Carbonised seed is fairly large, ovoid with thick seed coats measuring 5.00 x 3.75 x 3.50 mm in size. In appearance this seed compares to that of either *Gossypium* or *Thespesia* of Malvaceae. On the basis of size the above seed is referred to the genus *Gossypium*.

The genus *Gossypium* can be divided into two groups - the wild and the cultivated. Seeds in wild species are comparatively small, longish and have thick seed coats unlike the carbonised one. There are two species of diploid old world cotton cultivated in India, namely *Gossypium arboreum* Linn. and *G. herbaceum* Linn., seeds in both are more or less alike morphologically as well as anatomically. The above carbonised seed may safely be referred to any one of them.

The occurrence of this fibre crop is noticed at the site.

D. Wild Taxa

Seed of Silk-cotton Tree (Figs 4, 4a): The obovoid seeds having smooth surface and measuring 4.25 x 3.50 x 3.25 mm in length, breadth and thickness, respectively resemble with those of *Salmalia* of family Bombacaceae when compared with the extant one (Fig. 4a). The only species *Salmalia malabarica* (DC) Schott & Endl. of economic importance is found in this region, so it has been referred to this species.

Jujube Fruit-stone (Fig. 6): There are few small pieces of carbonised stone pieces having spherical shape. Ornamentation pattern on the surface of fruit is somewhat tuberculated. No specific identity could, however, be determined, but from the shape and general appearance the fruit-pieces compare with the small-sized, spherical drupe of *Ziziphus nummularia* (Burm. f.) Wight & Arn., which is commonly found in this region.

DISCUSSION AND CONCLUSION

The fragmentary remains of seeds and fruits from northern black polished ware phase of human settlement at ancient Kausambi (ca 600-450 B.C.), a great urban centre, consist of barley (*Hordeum vulgare*), bread-wheat (*Triticum aestivum*), field-pea (*Pisum arvense*), cotton (*Gossypium arboreum/ heraceum*), Silk-cotton (*Salmalia malabarica*) and jhar-beri (*Ziziphus nummularia*). Earlier cultivated rice was also recorded at Kausambi (Vishnu-Mittre 1974). The evidence of cultivated rice as a crop is well known from proto-Historical and early-Historical communities in northern India (Saraswat 1986). Barley, wheat and field-pea were the

main crops of Harappans and by the second millenium B.C. This Harappan agriculture started diffusing in the Ganga-Yamuna Doab (Saraswat 1992). A comparable plant economy is known from Uttar Pradesh at Sringerapur on the left bank of river Ganges in Allahabad District, Atranjikhera in Etah District; Narhan in Ghagra Valley of Gorakhpur District and Hulaskhera in Lucknow District (Saraswat 1986, 1980; Sharma 1989 & Chanchala 1992). The occurrence of wheat, barley, rice and pea in ancient agricultural economy at Kausambi is well understood and self-explanatory. It records the continuation of the same crops in the later times.

The evidence of cotton in India goes back to Harappan times (ca 2,300 - 1,750 B.C.) as ascribed by Gulati and Turner (1928). The diffusion of cotton may be traced from Harappan times in north - western India. Cotton from this ancient site indicates simply the eastward diffusion of this crop.

The seeds of *Salmalia malabarica* (DC) Schot. & Endl., a silk-cotton tree, is of common occurrence in the sub-Himalayan region (Duthie 1960). Its wood charcoals have already been recorded from Sringerapur in Allahabad District of Uttar Pradesh dating back from 950 to 800 B.C. (Saraswat 1989; p. 110).

The find of jujube (*Ziziphus nummularia*) is an additional record at this site in the northern Gangetic plain. It is a common spring shrub growing in this region and its fruits known as "Jhar-beri" are eaten locally.

The above finds of seeds and fruits reflect upon the type of plant taxa used at ancient Kausambi, and provide an additional evidence to the continuation of similar plant economy in Ganga Valley during 600 to 450 B.C.

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