1985

Paleoethnobotanical Research in Khuzestan

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Abstract
Khuzestan has one of the most detailed and well documented archaeological sequences in the Near East, thanks to years of excavation and survey by many researchers. This work has led to some understanding of political, economic, and social life in southwestern Iran from the time of the early villages to that of the early states and the historic empires. Over the millennia, agriculture and pastoralism formed the economic basis of the region. But ecological and economic relationships were by no means static, for the people of southwestern Iran transformed their environment even as they built their civilizations. Paleoethnobotany has the potential to offer unique insights into the agricultural and pastoral economies of ancient Khuzestan, and can provide a case study of the long-term interrelationships between environmental, economic and social conditions.

Disciplines
Near Eastern Languages and Societies

Comments
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PALEOETHNOBOTANICAL RESEARCH IN KHUZESTAN

N. F. MILLER

Khuzestan has one of the most detailed and well documented archaeological sequences in the Near East, thanks to years of excavation and survey by many researchers. This work has led to some understanding of political, economic, and social life in southwestern Iran from the time of the early villages to that of the early states and the historic empires. Over the millennia, agriculture and pastoralism formed the economic basis of the region. But ecological and economic relationships were by no means static, for the people of southwestern Iran transformed their environment even as they built their civilizations. Paleoethnobotany has the potential to offer unique insights into the agricultural and pastoral economies of ancient Khuzestan, and can provide a case study of the long-term interrelationships between environmental, economic and social conditions.

Compared to the amount of archaeological research carried out in southwestern Iran, there has not been much paleoethnobotanical work. After Hans Helbaek's pioneering efforts on the Deh Luran plain (1), flotation samples were taken sporadically during the 1960s and 1970s. Today, in addition to the Deh Luran report, there are several studies on the Deh Luran plain at Farukhabad (2) and in Susiana at Susa (3), Bendebal and Jaffarabad (4), and a brief mention of plant remains from Sharafabad (5). An analysis of pollen from the Deh Luran sites completes the inventory of paleoethnobotanical studies in Khuzestan (6). In addition, I have a few samples from Susa, Qabr Sheykheyn, and Sharafabad that are not yet analyzed.

The most comprehensive of these studies is Hans Helbaek's analysis of materials from Ali Kosh (7). He documented the presence of early agricultural communities in the lowlands, away from the natural habitat of the wild cereals. He also established an environmental and economic base line against which new data could be compared. The more recent studies cited above do not present a radically different environmental picture (8). Although new crops occur in deposits post-dating the Ali Kosh materials (notably bread wheat, dates, and rice), without extensive sampling for plant remains it is not possible to make fine distinctions among the agricultural practices of different sites and time periods.

A reanalysis of the Ali Kosh materials was presented to show how refinements in recording procedures and the development of new interpretive frameworks can be applied to archaeobotanical data. It was suggested that much of the charred seed assemblage could plausibly be interpreted as the remains of dung fuel, thereby directly shedding light on animal dietary patterns, and only indirectly on human food habits (9). The differential distribution of wild and cultivated plants in the deposits suggested differing strategies for feeding animals, possibly related to the degree of transhumance practiced by the inhabitants of the site. The reanalysis raised more questions than it answered, but it serves to illustrate some of the problems and potential of archaeobotanical analysis :

First, charred plant remains tend to be small, fragile, and sparsely distributed within the site matrix. Therefore, flotation is often used to recover plant remains. Since it is neither possible nor desirable to float all excavated sediment, sampling procedures must be devised to ensure recovery of an adequate and representative quantity of plant remains. Typically, this means taking several hundred sediment samples, rather than the more usual ten or twenty. It is also important that archaeologists provide material from a variety of deposits, both seemingly sterile and rich, and to actively seek middens and other refuse disposal areas.

(1) HELBAEK, 1969.
(2) RADFORD, 1980; MILLER, 1981.
(3) MILLER, 1982.
(4) MILLER, 1977, 1983.
(5) WRIGHT *et al.*, 1978.
(6) WOOSLEY and HOLE, 1978.
(7) HELBAEK, 1969.
(8) See also KIRKBY, 1977.
(9) See MILLER and SMART, 1984.

Second, standards of archaeobotanical recording have improved over the years, so archaeologists should provide (and archaeobotanists should report) sampling strategies, the archaeological contexts of the samples, and deposit-by-deposit inventories of seeds and other plant parts. Quantification is an indispensable tool for plotting changes in charred botanical assemblages through space or time. Not only will proportions of different taxa change, but the density of charred material may indicate functional or seasonal differences between deposits. For this reason, the archaeologist must also tell the archaeobotanist how much sediment was processed for each sample.

Third, unlike other materials, the charred plant remains found on archaeological sites reflect both general environmental conditions and human cultural practices. A good understanding of archaeological context is therefore critical for proper interpretation. For example, firewood is more representative of local woody vegetation than roof beams, but it is only the archaeological context that can tell us to which purpose a given piece of wood charcoal was put. Although direct analogies to the past cannot be drawn, we also need to improve our understanding of how present-day plant communities in Khuzestan respond to different agricultural practices and « natural » environmental conditions. Richard Redding (10) started a collection of modern plants in order to identify the weed communities associated with irrigated and unirrigated fields. Additional collections, perhaps supplemented by some experiments with traditional agricultural practices, would greatly enhance our ability to interpret archaeobotanical assemblages from Khuzestan.

Finally, there are many research problems that require a regional perspective. An archaeobotanical research design can easily be accommodated within a broad archaeological program of survey and excavation. Sampling strategies and excavation procedures should be clearly defined and consistently applied, in order to minimize the uncertainties of intra- and inter- site comparisons.

Many of these problems are not specific to the archaeobotanical record of southwestern Iran, yet they must be addressed if our interpretations of the ancient agricultural system and the interaction between human populations and the environment are to have any validity. It will then be possible to tackle a series of fairly broad questions about the long-term development of man-land relationships in southwestern Iran :

First, how effective was rainfall agriculture in providing a stable food supply for the early villagers ?

Second, how did small-scale irrigation affect agricultural specialization and production ? Did the more secure agricultural base permit experimentation with new crops, and how widespread was the ability to make capital improvements on the land in the form of canals and orchards ?

Third, how does a major center (i.e., Susa) differ from sites in its hinterland ? Does it have differential access to particular crops or other plants ? Is control over agricultural production correlated with other manifestations of centralized control ?

Fourth, how did changes in the relationship between farmers, their crops and animals, and land use affect the pastures and movements of nomadic pastoralists, and vice versa ?

Finally, how were the east and south Asian domesticates, such as rice and sugar, introduced, and how were they integrated into the economy of Khuzestan ? Were they rapidly accepted by all segments of the population, or did ethnic or economic barriers limit the spread of the new crops ?

It is clear from the above discussion that the paleoethnobotanist must work together with the excavator at all stages of the research for the maximum potential of paleoethnobotanical analysis to be realized. Paleoethnobotanists are loath to trace major economic and environmental trends on the basis of low numbers of samples and small quantities of material. The selection of sites to excavate affects the questions that may relevantly be asked. Excavation and sampling strategies are also important. It is only through cooperation, and the involvement of paleoethnobotanists at all stages of research, that we will be able to fully realize the potential of the archaeobotanical record of southwestern Iran.

(10) REDDING, pers. com.

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BIBLIOGRAPHY

HELBAEK H.
1969 Plant collecting, dry-farming, and irrigation in prehistoric Deh Luran. *In* : HOLE F., FLANNERY K.V. and NEELY J.A. (eds.). Prehistory and Human Ecology of the Deh Luran Plain. *University of Michigan Museum of Anthropology Memoir*, 1 : 383-426. Ann Arbor : University of Michigan.

KIRKBY M.J.
1977 Land and water resources of the Deh Luran and Khuzistan plains. *In* : HOLE F. (ed.). Studies in the Archaeological History of the Deh Luran Plain, The Excavation of Chagha Sefid. *University of Michigan Museum of Anthropology Memoir*, 9 : 251-288. Ann Arbor : University of Michigan.

MILLER N.F.
1977 Preliminary report on the botanical remains from Tepe Jaffarabad, 1969-1974 campaigns. *Cahiers de la DAFI*, 7 : 49-53. Paris : Association Paléorient.
1981 The plant remains. *In* : WRIGHT H.T. (ed.). An Early Town on the Deh Luran Plain, The Excavations at Tepe Farukhabad. *University of Michigan Museum of Anthropology Memoir*, 13 : 227-232; 427-430. Ann Arbor : Michigan.
1982 Plant remains from Ville Royale II, Susa. *Cahiers de la DAFI*, 12 : 137-142. Paris : Association Paléorient.
1983 Paleoethnobotanical results from Bendebal and Jaffarabad. *Cahiers de la DAFI*, 13 : 277-284. Paris : Association Paléorient.

MILLER N.F. and SMART T.L.
1984 Intentional burning of dung as fuel : a mechanism of the incorporation of charred seeds into the archeological record. *Journal of Ethnobiology*, 4 : 15-28.

RADFORD D.S.
1980 *The Study of Ancient Plant Material from Tepe Farukhabad : An SEM Approach.* Master's thesis, the University of Southampton.

WOOSLEY A.I. and HOLE F.
1978 Pollen evidence of subsistence and environment in ancient Iran. *Paléorient.*, 4 : 59-70.

WRIGHT H.T., MILLER N.F. and REDDING R.W.
1978 Time and Process in an Uruk rural center. *In* : BARRELET M.T. (éd.). *L'archéologie de l'Iraq : Perspectives et limites de l'interprétation anthropologique des documents* : 265-282. Paris : CNRS.