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Research Article

PALEODIETARY STUDIES OF THE ANCIENT QALA-PIROUZ-ALI AREA IN THE THIRD MILLENNIUM BCLily Niakan^{1*}¹Member of the Scientific Committee of the Archeology Research Institute of Cultural Heritage and Tourism, Tehran, Iran.**Abstract:**

In the cultural area of western Iran, Seymareh River as a vital artery has been able to create settlement sites on its margins along the history. The objective of the present study is to obtain information on the study of vegetation and the type of nutrition of ancient societies in central Zagros. Archaeological studies are especially important in prehistoric and protohistoric periods regarding the study of bone data and animal remains. Studying the paleodietary of ancient humans is one of the most significant issues in archaeological research that can simulate prehistoric ecological conditions in terms of vegetation and animals in ancient areas. It can help identify and formulate human settlements in cultural fields through collecting valuable data and environmental samples. It is able to understand the livelihoods and the complex human relationships with the environment through collaboration with the interdisciplinary sciences especially zoology and botany. The remains of the plant and animals on this ancient site were studied botanically and archeologically, based on which the diet of the inhabitants of Qala-Pirouz-Ali on livestock, fishery and agriculture was confirmed. The presence of samples of cereals, fruit, animals and fish bones indicates the nutrition of the inhabitants of Qala-Pirouz-Ali in the third millennium BC, which is the beginning of the residence at the margins of the Siab River in the Seymareh River area.

Keywords: Paleodietary, Qala-Pirouz-Ali, Seymareh River, Lorestan.***Corresponding author:****Lily Niakan,**

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INTRODUCTION:

Seymareh River has a considerable diversity of vegetation and special ecological groups due to its geographical position and location in the Zagros Mountains in the provinces of Ilam and Lorestan. The exact recognition of plant ecological species in this area can lead us to obtain findings derived from the Qala-Pirouz-Ali in this geographical area. Botany is one of the interdisciplinary sciences in the field of environmental archeology which studies plant remains discovered in fossils in the archeological sites. Ancient environmental studies and interdisciplinary knowledge have entered the archeological studies in Iran over the past few decades. It has been able to take an important step in the process of recognizing economic livelihood and diets in prehistoric eras in the Sialk of Kashan, Zagheh in Qazvin plain, Shahr-e Sukhteh of Sistan, Konar Sandal of Jiroft, Eastern Chiasabz of Seymareh, and other archeological areas. The Seymareh River is at the joint border of Ilam and Lorestan provinces with a length of about 243 km which has been created by the confluence of the Qaresou and Gamasiab rivers. This river, after passing through various anticlines and turns, has created the Karkheh River at the confluence of the great anticline of Kabir Kuh with the Kashkan River (1). In terms of geological structure, this area is known as the Zagros fold, the geographic area of which extend from the central Zagros in the south of Kermanshah to the south of Khuzestan plain. The sediments of the Zagros folded region belong to the third geological period, the structure of which has been recorded as regular anticlines and synclines. The erosion resulting from the formation of a corroded area in the heart of the anticlines and synclines has created vast plains in this geographical area (2). Due to its geographical location in Ilam and Lorestan provinces and Zagros Mountains, this river has a considerable diversity of vegetation and special ecological group. It has played a significant role in the provision of agricultural water from ancient times to date. Based on the studies on the geographical area of Lorestan, various vegetative ecological domains can be mentioned in the Seymareh basin. A large part of this area is covered by the Zagros Oak Forest. The presence of wild pear trees and unique masses of mountain almonds and other species located in Kabir Kuh are considered as specific plant species in the region of the study area. The study area, based on climatic divisions, encompasses cold semi-arid, very cold semi-arid, cold Mediterranean, very cold Mediterranean, semi-humid, cold, very cold semi-humid regions. In the Ilam section of this area, due to the Kabir Kuh Mountains, there are all the above mentioned climates; however, the Lorestan section

includes only two cold semi-arid and very cold semi-arid climates. The rainfall of the region varies from at least 420 to more than 700 mm depending on the altitude of the climates (3). A brief look at the type of ecological units of the Seymareh river area, located in the current boundary of Lorestan and Ilam provinces, include: the ecological unit of oak forests in eight plant types, which except the lowlands of the Seymareh River, include most of the mountains of the region such as Kabir Kuh, Manesht, Kulm, and Zardalan Mounts (4). In the case of cold and very cold semi-arid, very cold Mediterranean, and cold semi-humid climates, located at an altitude of 1000 to 2000 meters above sea level and with efficient rainfall, varying from 480 mm and at lower elevations to 670 mm at higher altitudes, the dominant species is *Quercus brantii*. Furthermore, the ecological unit of oak and *Pistacia Atlantica* forest in this area is located on the northern slopes of Kabir Kuh in Zarrine Abad region and the mountains in the regions of Kulm and Pakel Grab in the province of Ilam along the Semareh river. The *Arabica Amygdalus* ecological unit is mainly located, in the form of an integrated mass, in Kulm Badreh region and in the vicinity of Seymareh River in the Khoshghadam area. In terms of climate, it is limited to a cold semi-arid area, at the altitude of 900 to 1500 meters above sea level and with the rainfall rate between 460 and 560 mm (5), and geologically, it is located in Gachsaran and Gypsum lands. The dominant species of this ecological unit is the *Amygdalus Arabica*, which include oak and *Amygdalus lycioides*, and species of bushes and annual herb plants seen as the same vegetation type (Table1)(3).

MATERIALS AND METHODS:

The ancient area of Qala-Pirouz-Ali, with the geographical location UTM: 0703683-3688846, is located at 3.5 km from the Seymareh dam, on the narrow strip of Kavasari fluvial terrace and the margin of Siab River on high, low and plain terraces (7-9). The Gachsaran Formation has encompassed the Strait of Siab and its fluvial terraces and have created favorable conditions for human settlements. The height of this hill in the higher extended terrace is over 60 meters; the height of the lower part of the area, which consists of three conical hills, is between 20 and 22 meters from the terrace. The altitude of this site is 680 meters in its lower region and 740 meters above sea level in the higher areas. Due to the clay remnants from the Susa II period in the Seymareh River area, this site is very important in terms of the emergence of township. Based on a season of exploration on successive deposits from the cultural remnants of Susa II and Susa III, which continued

from the beginning of writing to the era of Elamite, remnants of architectural structures related to the era of the beginning of the writing and the Elamite were obtained (6). These architectural structures had various applications, including security turrets, large hallways with adobe floors, bunkers and thermal installations in open spaces. Other findings include stone tools and artifacts, bone objects, oysters, mat, tokens, stamp seals, obsidian, and so on. According to studies, relevant data, which included carbonized vegetable seeds and animal bone remains collected from a stratigraphy worksite, provided us with useful information on the basis of the histological studies. The plant and animal remains in botanical and zoology studies determined that some parts of the inhabitants' diet of the Qala-Pirouz-Ali were provided from animal husbandry, fishing, and farming. A stratigraphy worksite was established on the southern side of the Qala-Pirouz-Ali hill on the middle terrace with a relatively steep slope. It was set up in 2×2 meters based on the recognition of shallow cultural materials, with the objective of identifying the cultural sequence and chronology. Architectural and exploratory stages were conducted using layer and feature methods. Due to its location on a steep terrace, the worksite included a large amount of deposits, pottery, stone artifacts and tools; therefore, the size of the worksite was extended to 3×5 meters. In fact, the main objective of this study was to identify the existing plant and animal species and understanding them in the livelihoods and economics of Qala-Pirouz-Ali residents in Siyab Strait, 2 km from the Seymareh River. In order to achieve environmental data in the cutting section during excavation, all surfaces with ash layers were collected after dry screening in the worksite area and obtaining materials within, which usually included fragments of small pieces of pottery, stone and bone tools (Fig1). After this step, to obtain plant seeds and germ, the screened ashes were transferred to the Siyab River bank and water screening operation was performed with tiny sieve-flashing springs. The sediment deposited on the basis of the ratio of screened ash grains of the plant seeds was placed in white cloths to be transferred to the base to collect and dry plant and animal materials. During the separation, samples were taken from coal and bone grains with great accuracy. Parts of the coal produced were badly damaged and few had a good protection status, which was an important factor in identifying species. The investigation of these materials was carried out by Dr. Lorenzo Constantini in the Archeology Plant Laboratory at the Iqurom Institute in Italy.

FINDING

The results of the present study include sedimentary layers, ash layers, charcoal, limestone grains and constructional structures of rubble trench and adobe rocks. In the underlying layers, the accumulation of ash from thermal installations and traces of fire on adobe rocks and semi-cooked adobe fragments, along with findings such as pottery, obsidian, sling, cutlery, mat, duk and seal marks were witnessed. In the continuation of the exploration, the green river sediments were discovered and the worksite reached to plain soil at 300 centimeters. Exploring results indicated that 15 layers, 5 structures, 3 periods of exploration, and 2 cultural periods related to the Susa II and Susa III era were identified and recorded. Botanical and zoology experiments on plant seeds and animal bones were obtained from ash screening and floatation process. Microscopic studies on these materials revealed that this collection included samples of cereals such as lentils, wheat, and barley, and samples from fruit trees such as oak, mountain almond, pistacia atlantica, wild pear and hawthorn. Aquatic animals like fish, river oysters, and snail shellfish were used in their diet. Bone parts from animals like goat and sheep were also discovered during the exploration, and in the fourth layer pieces of pottery with images of goats with high horns were discovered. This can confirm using this animal as a part of the diet of Qala-Pirouz-Ali inhabitants. Aquatic plants such as carex or straw which were used for mat weaving were also identified. In addition, grass which was used as heating fuel and a variety of stone handicrafts such as mortar, hammer, and stone boards like stone blades, indicate their good agricultural position. They also used Seymareh and Siyab River banks for agriculture; this can be regarded as indirect data, though it is a reason for the use of cereals in their diet. The presence of fishing sinkers and fishbone indicate fishing activities. The results of the experiments performed on the cultural materials demonstrated that the diet of the Qala-Pirouz-Ali inhabitants was provided through the livestock, fishing, and agriculture (Fig. 2). Furthermore, a few bone tools discovered from the exploration, which were used as instrument, were obtained in various sizes and dimensions. In one case, a piece of bone with about 5 cm height and 50 mm width, that can be a bird's bone, was obtained (Fig-3).

DISCUSSION:

The Seymareh River, as a vital artery throughout history, has been able to create settlements in the West of Iran that have remained unknown until now.

There have been available natural resources, such as good pastures, fertile sedimentary terraces, abundance of rocky resources, animal and plant resources, including wild species such as oak trees, pistacia atlantica, wild pear, mountain almond, hawthorn, as well as wheat and barley that grow in spring and autumn. Due to these resources, conditions for human settlement have been created during thousands of years, as it can be confirmed by cultural remains left on the margin of the river. Due to the cultural remains, such as architectural structures, beveled rim bowls, proto-Elamite pottery, bone objects, oysters, metal objects, furnace remains, stone artifacts, Sarduk, obsidian, stamp seal, token, bitumen, straw mat, plant and animal remains, it was argued that, the history of this area can be attributed to two civilizations of Susa II and Susa III. In addition, as a result of the favorable environmental situation and the strategic position of Qala-Pirouz-Ali, as well as the presence of objects like stamp seal, obsidian, and marble dishes during this period, simultaneous commercial-economic relations with other areas such as Zagros regions, southern Mesopotamia, and eastern Turkey is confirmed.

CONCLUSION:

The remains of the plant and animals on this ancient site were studied botanically and archeologically, based on which the diet of the inhabitants of Qala-Pirouz-Ali on livestock, fishery and agriculture was confirmed. The presence of samples of cereals, fruit, animals and fish bones indicates the nutrition of the inhabitants of Qala-Pirouz-Ali in the third millennium BC, which is the beginning of the residence at the margins of the Siab River in the Seymareh River area.

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Table 1. List of ecological vegetation units of Seymareh River area

	Ecological unit title	Mark on the map	Height range (meter)	Climate (De Martonne)	Rainfall range (mm)	Area (hectare)	Percent
1	Oak forest	Qu.br	1000-2200	Cold and very cold semi-arid, very cold Mediterranean, and cold semi-humid	480 670	240787.1	38.7
2	Oak and Pistacia atlantica forest	Qu.br Pi.at	700-2300	Cold and very cold semi-arid, cold and very cold Mediterranean	430 690	7475.8	1.2
3	Oak and Amygdalus lycioides forest	Qu.br Am.ly	900-2300	Cold and very cold semi-arid, cold and very cold Mediterranean	460 660	32787.3	5.3
4	Amygdalus lycioides woodlands	Am.ly	900-2400	Cold semi-arid, cold and very cold Mediterranean, very cold semi-humid	460 710	28051.6	4.5
5	Arabica Amygdalus	Am.ar	900-1500	Cold semi-arid	460 560	1278.5	0.2
6	One-year grass	An.gr	650-1300	Cold and very cold semi-arid	420 530	14402.9	2.3
7	Astragalus shrubs	As.sp	800-2300	Cold and very cold semi-arid, cold Mediterranean, and cold semi-humid	450 660	10069.4	16.2
8	Upper covers	Da.mu	1500-2500	Mediterranean and semi-humid	560 725	2291.4	0.4
Total					420 725	427764.2	68.7



Figure 1. Stratigraphy and dry screening operation at the stratigraphy worksite



Figure 2. Blade, small blade, stone artifacts, fishbone and sheep's jaw bones, and pottery pieces with goat images



Figure 3. A sample of a bony needle