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# *Hunting Armatures in L.S.A. of the Eastern Maghreb: The Case of the Southern Tunisian Sahel*

# تجهيزات الصيد في منطقة الساحل الجنوبي الشرقي للمغرب الكبير: حالة منطقة الساحل التونسي الجنوبي

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**Abstract:**
Capsian technical traditions provide a robust framework for artisans to efficiently produce arrowhead. However, a technological analysis of these blanks from the Upper Capsian and Capsian Neolithic periods reveals that creating arrowhead was not the primary goal of operational sequences during these periods. Instead, the methods, techniques, and materials used reflect a system that, while conservative, was adapted to the specific faunal environment and hunting practices of the time.
**Keywords:** Capsian, Neolithic, arrowhead, hunting, techniques.

**الملخص:**
توفر التقاليد التقنية القبصية إطارًا قويًا للحرفيين لإنتاج رؤوس الأسهم بكفاءة، ومع ذلك، تكشف أبحاثنا حول الجوانب التقنية لصناعة هذه النصال خلال العصرالقبصي الأعلى وعصر النيوليثي ذي التأثيرات القبصية إلى عدم وجود معالم واضحة ومهيكلة لصناعة هذه الأدوات؛ التي لم تكن الهدف الرئيسي للسلسلات الصناعية المعتمدة في هذه الفترات. بالمقابل تعكس الأساليب والتقنيات والمواد المستخدمة نظامًا، على الرغم من كونه محافظًا، قادرا على التكييف مع بيئة الحياة البرية وممارسات الصيد المعتمدة في ذلك الوقت.
**الكلمات الدالة:** قبصي، نيوليثي، سهام، صيد، تقنية.

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## Introduction:

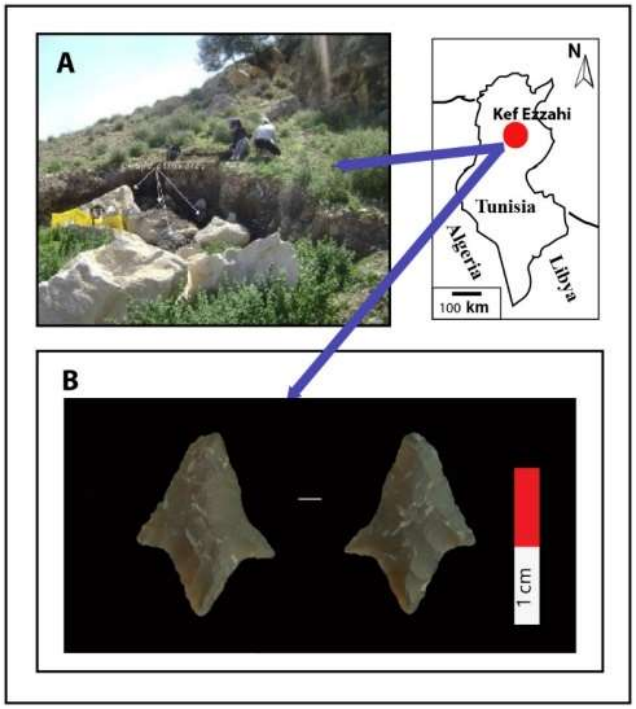
Arrowhead armatures have been documented in Upper Capsian levels[1] since the 7th millennium BC (FIG.1). The early presence of this type of armature, often associated with the Neolithic, within a Capsian context raises questions about its utility as a throwing tool, particularly given its under-representation in the lithic assemblages of the eastern Maghreb throughout the region's recent prehistory.

In contrast to Saharan sites, where arrowheads are often found in large quantities (hundreds per site), Capsian and Neolithic sites in the eastern Maghreb rarely yield significant numbers of these artifacts. Coastal sites, in particular, seldom contain more than ten specimens per site (Table 2). This scarcity stands in stark contrast to recent archaeozoological studies, which reveal extensive hunting activities conducted by skilled hunters. Many of these coastal sites appear to have functioned as temporary hunting camps rather than permanent settlements[2] .

Given these observations, it is essential to reassess the role of arrowheads in hunting practices during the recent prehistory of the eastern Maghreb. This reassessment must consider the orientation of debitage strategies and the broader purposes of lithic production. In this paper, we present findings addressing this question, drawing on data from our research in the southern Sahel region of eastern Tunisia.

[1] SAAFI, I., ET AL, «Étude malacologique du site Capsien supérieur de Kef Ezzahi (Kairouan, Tunisie)», In *L'Homme et l'Animal au Maghreb, de la Préhistoire au Moyen Âge*, edited by V. Blanc-Bijon & al., Presses universitaires de Provence, 2021, 79-87.

[2]BEN MOUSSA, S., «Approche de l'occupation humaine préhistorique de La Chebba et ses environs pendant l'Holocène», In *Histoire de La Chebba et de ses environs*, edited by S. Ben Moussa, Samad Editions, 2020,69.




(FIG. 1): The oldest arrowhead discovered in Tunisia (Upper Capsian site of Kef Ezzahi)

**A.** Excavation of the rammadiya in 2012 (After, Saafi and al. 2021, 80)

**B.** Arrowhead photo (After, Sghari 2022, 647).

## 1. Presentation of the Southern Sahel Region and the Series Studied

### 1.1. Geomorphology and Geology:

The study region (MAP 1) is bounded to the north by Cape Mahdia and to the south by Cape Kaboudia (Ras Kaboudia). It features a flat to gently undulating topography of plains and hills, which terminate on the seaward side with a low coastline or small cliffs. The low altitudes and gentle slopes have facilitated human settlement and movement throughout history.

The regional topography consists of two symmetrical floodplains flanking a central hilly area: the Ksour Essaf plain to the north and the El Bhira-El Bradaa plain to the south (MAP 1). The coastline varies, with a sandy shoreline in the north and a cliffed coastline in the south. The northern coastline is characterized by a relatively wide sandy beach accompanied by a line of dunes. The southern coastline, however, consists of cliffs interspersed with strips of beach, becoming sharply defined as they

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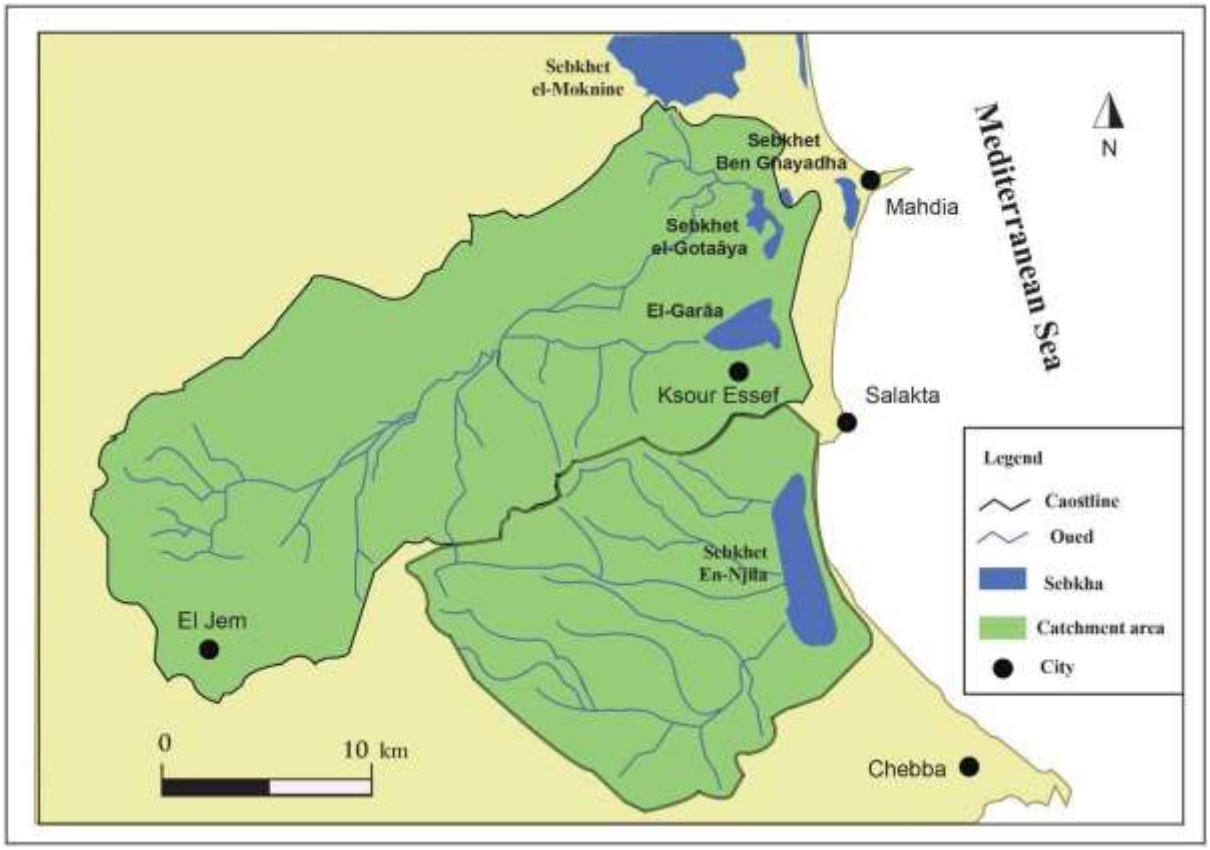
cut into the white sandstone of the Tyrrhenian fossil beach, from Cape Salakta towards El-Alia and Chebba[3].




(Map. 1): Topography of the southern Sahel region (Eastern Tunisia)

(CAD produced by the author from an extract of the 1/50000 topographic map of Mahdia)

## Geology

The region is composed of young geological outcrops, none older than the Upper Miocene[4]. The key geological formations include:

- **Miocene Clays**: These outcrop on the slopes of hills around Ksour Essaf and between Ksour Essaf and Salakta.

- **Mio-Pliocene Limestone**: Hard rock outcrops composed of beige to yellow limestone and sandstone, often containing marine fossils such as pectinids, crassostracans, and marine gastropods. These were formed in marine and lagoon environments approximately 7 million years ago.

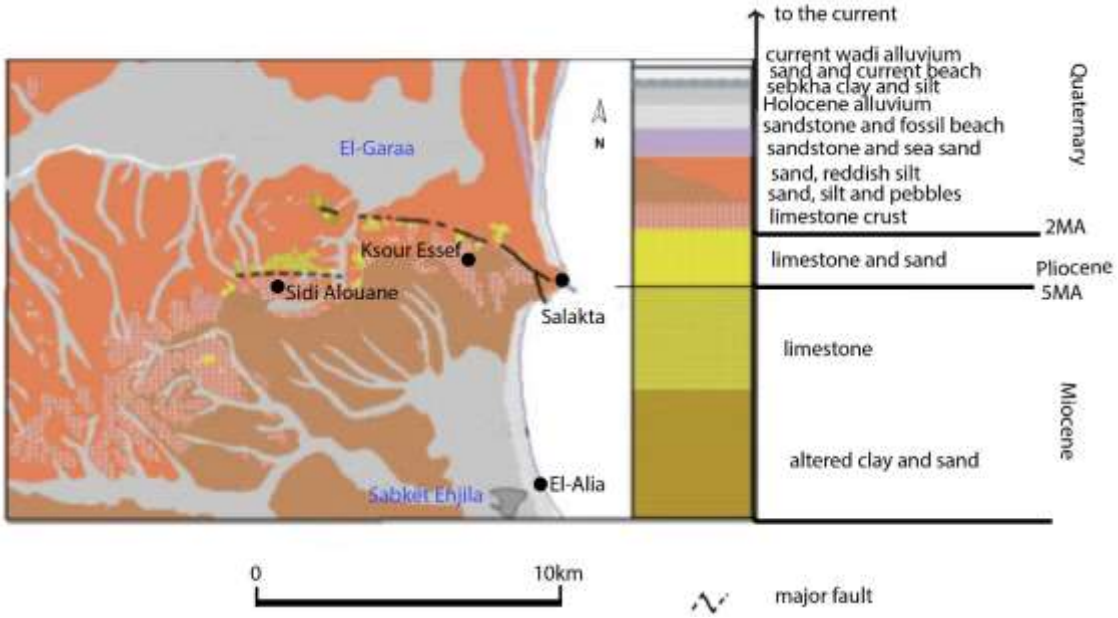
[3] BRAHIM, F., «Évolution de la paléolagune-sebkha d'Ennjila et de ses environs (Sahel tunisien – Tunisie orientale)», *Méditerranée* 125, 2015, 51-62.

[4] BRAHIM, F., «Le Sahel central et méridional : géomorphologie et dynamique récente du milieu naturel», *PhD Thesis*, Publications de la Faculté des Sciences humaines et sociales de Sousse, 2005.

• **Pliocene Limestone and Sand**: Deposits formed in a marine environment about 3 million years ago.

• **Limestone Crusts**: Overlying Pliocene limestones, sands, or ancient Quaternary deposits, these crusts are widely exposed south of the Ksour Essaf–Sidi Alouane hills. The oldest crusts date back to the early Quaternary period, around 2 million years ago.

This relatively recent geological formation (MAP. 2) largely explains the distant origin of the raw materials (TAB. 1).




**(MAP 2)** Geological formations of the southern Tunisian Sahel © F. Brahim 2005

(TAB.1) : Origin of the raw material from Chebba sites

| Raw material | Origine | Age | Nombre |
|---|---|---|---|
| Blond to brown flint | F. abiod | Eocene | 63 |
| Unidentified flint | Patine total | - | 37 |
| Grey flint | F. abiod | Eocene | 02 |
| Pink flint | Kairounais ? | - | 01 |
| Caramel flint | F. Thelja | Eocene | 01 |
| Translucent blond flint | F. abiod | Eocene | 02 |
| White flint | F. Abiod ? | Eocene | 01 |
| Sandstone-limestone | local | Upper Pleistocene | 04 |
| Total | | 111 | |

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## 2. Typology of Prehistoric Sites: Hunting Stopover or Seasonal Occupation?

The rammadiyat[5] of the Sahel coast are typically small, shallow archaeological sites. These sites usually feature archaeological layers less than 1 meter thick and have a diameter not exceeding 20 meters. Such characteristics suggest relatively limited occupation. In contrast, sites further inland exhibit more extensive archaeological layers and larger dimensions, indicating significant, long-term habitation.

Our archaeological investigations in the southern Sahel region[6], particularly at El-Alia (Mahdia), have uncovered numerous faunal remains relative to the excavated area (476 pieces from a 2m × 1m × 0.4m trench). These remains are generally well-preserved due to favorable diagenetic conditions. However, cranial remains are rare, with only a few dental fragments recovered. Most of the bones are small and highly fragmented, a pattern consistent with findings from other rammadiyat excavations.

The small size of these coastal sites, coupled with the abundance of faunal remains, suggests a pattern of seasonal occupation by pre-Neolithic and Neolithic groups. These groups likely exploited a variety of resources along the southern Sahel coast, including faunal, halieutic, and marine mollusc species, such as cardium and murex. The presence of low tides and marshy areas along the coastline would have facilitated the harvesting of these resources.

This seasonal occupation aligns with the semi-nomadic lifestyle of Neolithic populations or groups undergoing Neolithisation. These communities likely migrated between the coast and the interior, adapting their movements to the availability of resources[7].

## II. Exogenous Origins of Arrowheads?

Early research on arrowhead armatures from the North African coast, particularly in Tunisia, often regarded them as "imported objects." This

[5] **Rammadiya** (plural: *rammadiyat*) refers to a typical site from the Capsian and Neolithic traditions. It consists of a heap of ash, terrestrial helixes, burnt stones, carved flints, and other organic remains such as bone fragments and broken ostrich eggshells.

[6] BEN MOUSSA, S., BELHOUCHET, L., AOUADI, N., & JABALLI, R., «Peuplement et mode de vie préhistoriques dans la région d'El-Alia (Salakta, Mahdia, Tunisie orientale)», In Byzacium, Byzacène, Muzaq : *Occupation du sol, peuplement et modes de vie*, *edited by A. Mrabet, 12-28, Actes du 6e colloque de Sousse, 2021.

[7] BEN MOUSSA, «Approche de l'occupation humaine préhistorique de La Chebba et ses environs pendant l'Holocène», 74.

interpretation was based on their limited numbers (Map 3 and Table 2) and the invasive bifacial retouching characteristic of these artifacts. Initial studies linked these arrowheads to a "Neolithic" and "Saharan" tradition[8].

However, other researchers, such as G. Camps, have rejected the African origin of these armatures. Camps argues that, apart from their morphology, no other Saharan cultural elements are present at these coastal sites. Evidence such as Saharan-style artworks, ceramics, or the abundance of geometric microliths is notably absent[9].

Camps instead proposes a European origin for some of these arrowheads. He links certain forms to the European Final Neolithic, suggesting connections to the emergence of early metal objects during the Chalcolithic period, such as pedunculated points with fins. Other types, such as armatures with transverse cutting edges, are thought to be associated with the Cardial Neolithic and impressed ceramic traditions.

Despite the contrasting theories regarding the origins of these arrowhead armatures, early studies agree on two key points:

- The allochthonous origins and/or external influences of these armatures.
- Their association with the Neolithic period.

(TAB. 2): Arrowhead armatures in Neolithic sites on the Tunisian coast

| Type Site | Non-precise armatures type | Cross-cut armatures | Stalkless or concave-base foliated armatures | Armatures with stalks and fins | Javelin |
|---|---|---|---|---|---|
| Ouchtata | 10 ? | | | | |
| Bechateur | | 13 | 15 | 15 | 1 ? |
| Cap Blanc | 1 | 1 | | | |
| Henchir er Rhara | | | | 1 | |
| Korba | | 3 | 2 | 2 | |
| Chebba | | | 2 | 2 | |
| Total Tunisian coastline: | 11 | 17 | 19 | 20 | 1 |

[8] DE BAYLE DES HERMENS, M., & DE BAYLE DES HERMENS, R., «Influences sahariennes dans le Néolithique de la région de Tiaret (Algérie)», *Bulletin de la Société préhistorique française* 60, 1963, 79-91.

[9] CAMPS, G., «Sur la valeur chronologique des pointes de flèches dites 'sahariennes' du littoral nord-africain», *Revue d'Histoire et de civilisation du Maghreb* 2, 1967, 7-15.

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| | | | | | |
|---|---|---|---|---|---|
| 68/(140) | | | | | |

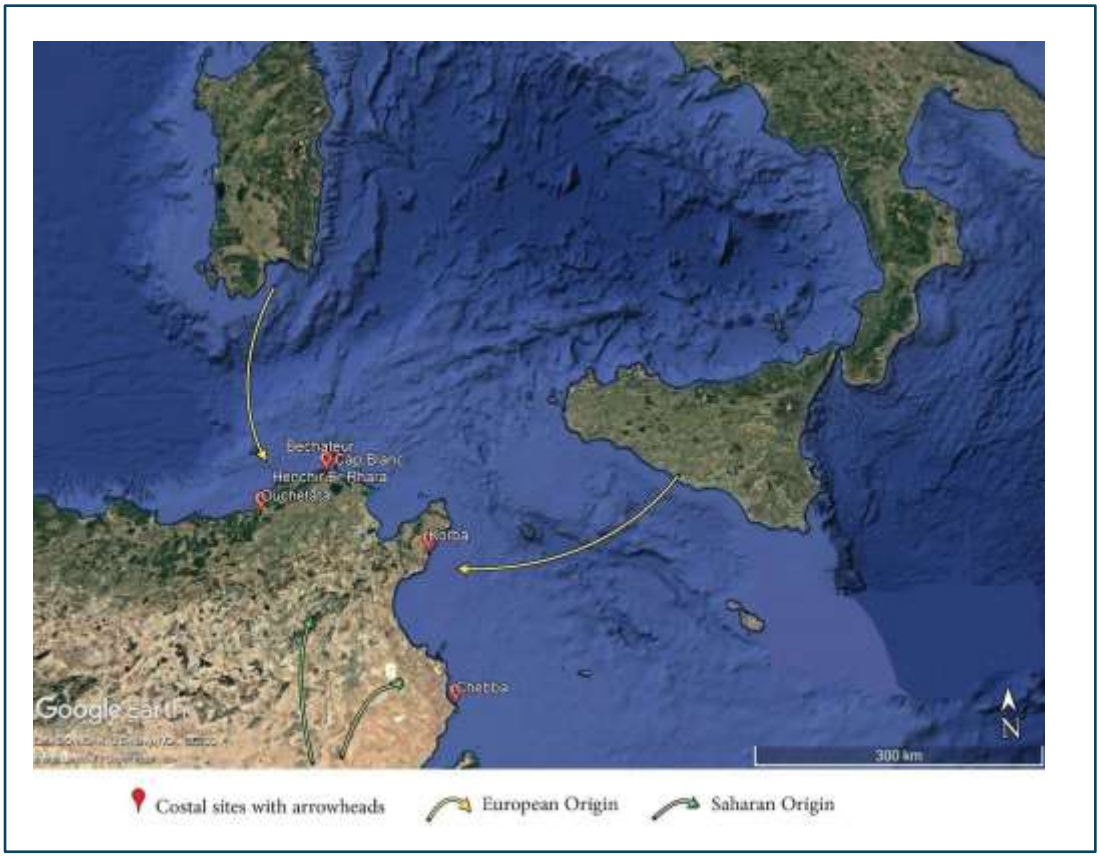
©G. Camps, 1967.

However, these assumptions appear to overlook several critical factors: the strategies employed by hunters and their interactions with the animal world, the significance of local technical traditions, and the potential alternative uses of these armatures beyond hunting.

This raises important questions:

- How can we account for the presence of these armatures, albeit in small numbers, among the possessions of hunters at sites that predominantly suggest seasonal hunting halts?
- Are these armatures truly imported objects?

To address these questions, we will analyze a selection of sites in the southern Tunisian Sahel and examine the hunting strategies of these groups. This analysis will consider the diversity of fauna hunted and the tools utilized in their hunting practices.




(MAP. 3) Supposed origins of arrowheads from LSA sites on the Tunisian coast

## 3. Fauna and Hunting Armatures During the Late Stone Age (L.S.A.)

### 3.1. Fauna Hunted on the Tunisian Sahel Coast

The analysis of organic remains from several typical Capsian (10,000–9,000 cal BP) and Upper Capsian (9,000–7,500 cal BP) sites reveals a subsistence economy characterized by a combination of seed and fruit gathering, fishing, and hunting. These activities targeted large mammals, small prey (such as rabbits, hares, and small carnivores), and birds, reflecting the seasonal exploitation of habitats across the diverse environments of the eastern Maghreb[10].

During the typical Capsian period, hunting predominantly focused on large prey, with relatively less emphasis on medium-sized to small fauna, including birds and reptiles[11]. However, in the Upper Capsian period, while no abrupt changes in faunal exploitation are evident, there is a noticeable increase in the presence of microfauna in the archaeological record (Fig. 2).

On the coast, the composition of archaeofauna reflects the specific ecological conditions of each site while also indicating a broader faunal spectrum[12] .This diversification is particularly evident at well-dated sites such as SHM1 (Hergla) and El-Alia. At these sites, the techno-typological evolution of the lithic industry corresponds with an expansion in the variety of animals hunted. The rare regional variations (between coastal and inland areas) are, in our view, adaptations by transhumant groups to specific, often seasonal, conditions affecting the animal resources available (small fauna: fish, birds, lagomorphs, amphibians, and reptiles).

[10] DRIDI, Y., & AOUADI, N., «Néolithisation et néolithique de Tunisie : Les sites et leur faune domestique», Encyclopédie berbère 34, 2012, 5481-88.

[11] AOUADI, N., MULAZZINI, S., & MABROUKI, M., «Vivre aux temps des Capsiens (10000-7000 cal B.C.)», In Aux origines du Capsien en Tunisie, edited by N. Aouadi & M. Harbi-Riahi, Simpact Editions, 2020, 61-65.

[12] AOUADI, N., ET AL.,«La faune de la rammadiya capsienne de SHM-1 (Hergla, Tunisie)», In Le Capsien de Hergla (Tunisie) :Culture, environnement et économie, edited by S. Mulazzani, Reports in *AfricanArchaeology* 4, 2013, 320-332.

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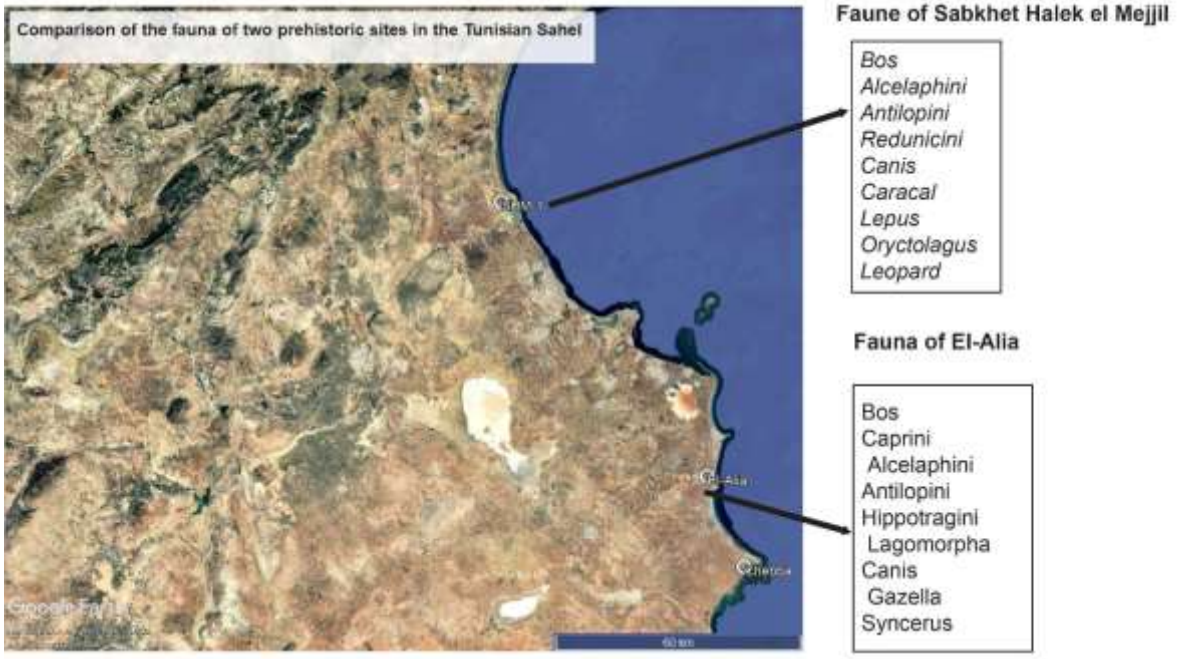


**(FIG. 2)** Comparison of faunal spectra at coastal sites

©based on the work of Nabiha Aouadi et al. 2014, Ben Moussa et al. 2021

## 2. Armatures Available to Hunters

Evidence from lithic technology and North African rock art (Fig. 3 and 4) indicates that Capsian and Neolithic hunters utilized two main types of armatures:

- **Harpoon/Assegai Weapons**: These javelins were equipped with bladeletts and/or microliths and served distinct purposes:
  - The **harpoon**, often lighter, was primarily used for fishing.
  - The **assegai**, a heavier javelin, was employed to hunt large mammals. It was typically propelled using a spear-thrower (*atlatl*), enhancing its range and impact (Fig. 3).
- **Bow Armatures (Arrowheads and Broadheads)**: The introduction of the bow and arrow represented a significant technological advancement. This innovation enabled hunters to achieve greater precision and range. Arrowheads were crafted using bifacial pressure retouching techniques to create sharp and efficient armatures (Fig. 4).

### 2.1 Assegai/Harpoon Armatures: Typology, Technology, and Use

According to current research, the oldest bladelett and microlithic flint armatures used as barbed elements in North Africa are thought to date from the Iberomaurusian period, between around 25,000 BP and 10,000

BP[13]. The appearance of microliths in North Africa marks the Epipaleolithic period (postglacial period).

The proliferation of microlith types, produced using the microburin technique, is characteristic of the Capsian and Neolithic traditions. This increase in microlith diversity coincides with a climatic warming that altered the fauna, flora, and the behavior of the region's hunters.

Very common in many North African LSA cultures, these armatures, which armed javelins, were used as "barbs." In the form of a lateral, pointed, or sharp protuberance, these armatures were designed to tear the body tissue of prey, causing deep wounds, while at the same time holding the weapon in place and preventing it from being ripped off when the affected animal fled.

### 2.1.1 Typology:

Microlithic flint armatures used in assegai and harpoon production during the Capsian and Neolithic periods of the Capsian tradition were primarily composed of:

-**Bladeletts and Non-geometric Microliths**: Bladeletts were the most common type of tool found in Capsian lithic assemblages.[14] Whether rough or retouched, bladeletts were indispensable for the manufacture of hunting tools.

In the southern Sahel of Tunisia, the flint stones used to produce these bladeletts range in color from blond to brown. Their dimensions typically fall within the following ranges: length between 15–25 mm, width between 10–20 mm, and thickness generally between 3–5 mm. A conventional length of around 2.5 mm was often maintained, and the thin bladelett structure was ideal for creating microliths.

-**Microlithic Armatures**: These armatures, including both geometric[15] and non-geometric forms, were designed to be fitted to tools and weapons. The small size (length < 2.5 mm) and thinness of the microliths made them particularly effective for use as armatures. Geometric microliths,

[13] SARI, L., «L'Ibéromaurusien, culture du Paléolithique supérieur tardif : approche technologique des productions lithiques taillées de Tamar Hat, Rassel et Columnata (Algérie)», *PhD Thesis*, Université Paris X-Nanterre, 2012, 394-399.

[14] TIXIER, J., *La typologie de l'Épipaléolithique du Maghreb*, Mémoire du C.R.A.P.E, 2, Arts et Métiers Graphiques, 1963, 96-117.

[15] TIXIER, *La typologie de l'Épipaléolithique du Maghreb*, 127-137.

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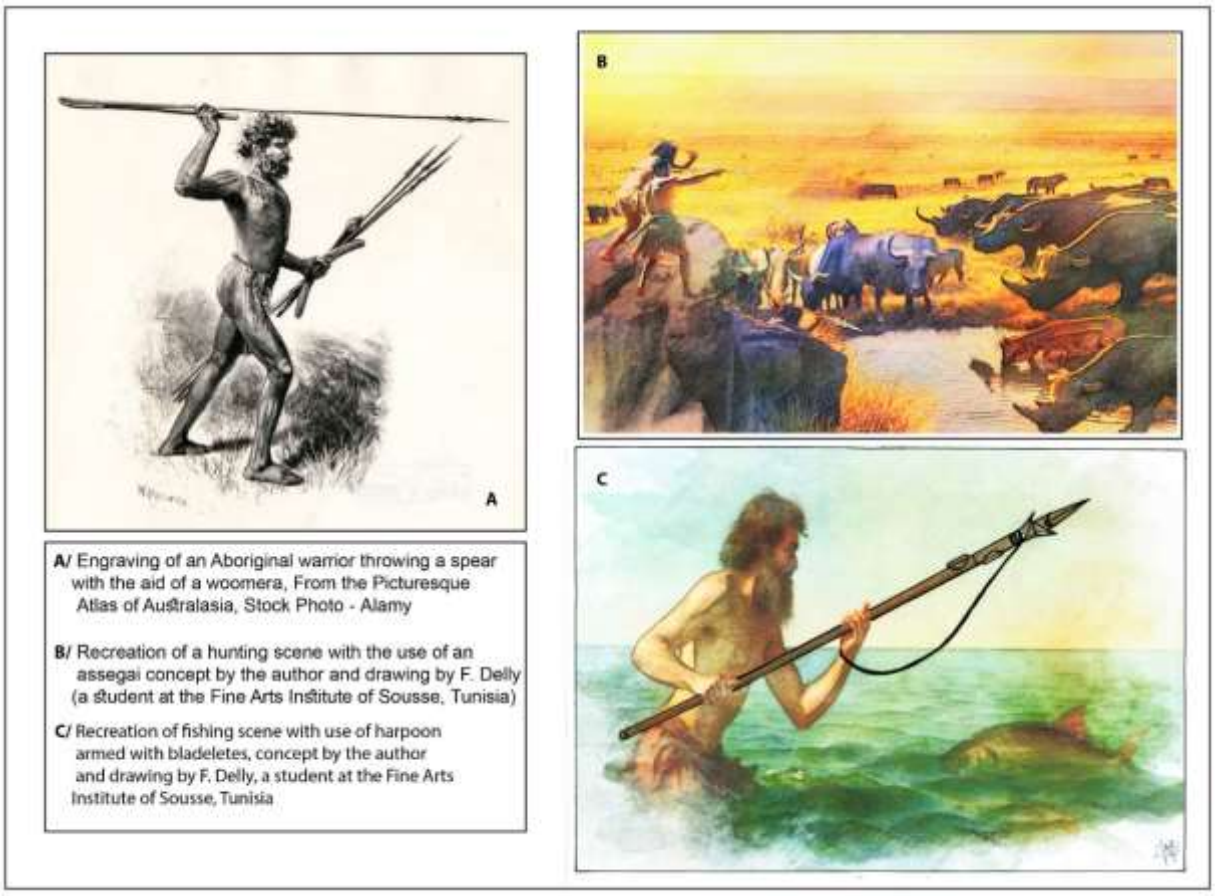
commonly found at all studied sites, were produced using the microburin technique. These microliths exhibit various shapes, each with specific characteristics:




**(FIG. 3)** Restitution of the Harpoon/Assegai Weapons

* **Segments (or Half Circles)**: These resemble a segment of a circle. The arc is created through abrupt retouching, either as an abraded edge or through joined convex truncations. The chord forms a roughly straight edge, which may be rough-cut, partially retouched with semi-abrupt techniques, or, less commonly, fully retouched.

* **Triangles**: This shape represents an innovation unique to the Capsian period. A triangular microlithic armature with three distinct angles is created by combining two truncations. The third side is generally straight and may sometimes be retouched.

* **Trapezoids**: This geometric microlith features two truncations, resulting in two approximately parallel edges on the blade or strip. These edges are referred to as the "small base" and "large base." To avoid confusion, the term "base" is always qualified (e.g., small base, large base). When the

truncations are unequal, the angle between the longest truncation and the large base is referred to as the "large point."

### 2.1.2 Technology:

In the Sahel region, bladeletts form the foundation of several tool-making processes. The small size of the cores does not fully explain the prevalence of microliths. For example, at El-Alia, a reconstructed operating sequence reveals that, despite the limited raw material and the distance from extraction sites, the debitage process was directed toward producing long supports (blades and bladeletts). These long supports were almost always transformed into tools, whereas the flakes had a lower transformation rate. The flakes were mainly used for preparing striking platforms and repairing cutting accidents that occurred during the preparation of the long supports.

The preference for bladelett supports is further evident in the use of the chisel technique to detach bladelett chutes. This technique is a distinctive feature of the Capsian and Neolithic industries of North Africa, particularly in the use of burin-core.

### 2.1.3 Use:

Microliths were mounted onto perishable materials such as wood or deer antlers to form tools like assegais (spear-like weapons), harpoons, and shafts. These tools, though not widespread throughout much of North Africa, were designed for use with a thrusting spear. They were effective for hunting various types of game, particularly large mammals, although they were typically used at relatively short distances.

The assegai, when launched with a thrusting spear, had considerable penetration power, but its accuracy was about a third that of the bow and arrow. While this hunting technique originated during the Iberomaurusian period, its use is also confirmed during the typical Capsian period (utilizing scalene segments and triangles). With this technique, assegais measuring 2.5 to 3 meters in length and weighing between 150 and 250 grams could be thrown effectively at a distance of 20-30 meters[16].

[16] ROZOY, J.-G., «Le propulseur et l'arc chez les chasseurs préhistoriques. Techniques et démographies comparées», *Paléo* 4, 1992, 75-93.

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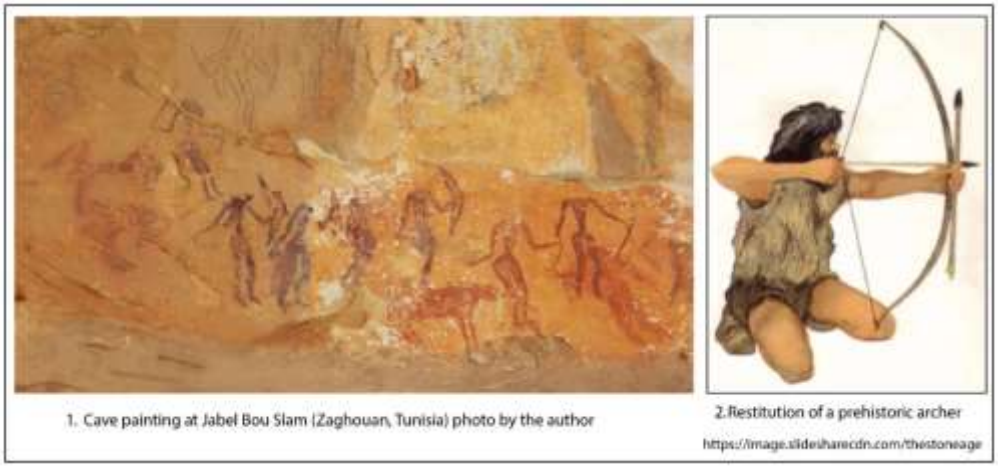


(FIG. 4): Representation of the bow in North African rock art

©Zaghouan, Tunisia and its possible restitution

## Discussions:

The analysis of pedunculated arrowheads from Eastern Maghreb coastal sites reveals a lack of standardized production, raising questions about their primary function. To evaluate this, we suggest two testable hypotheses:

- Hunting Function Hypothesis: If these arrowheads were primarily used for hunting, we would expect: Consistent macroscopic impact fractures (e.g., step-terminating bending fractures[17]. Micro-wear patterns (e.g., edge rounding, striations) associated with projectile use[18].

- Symbolic/Ritual Function Hypothesis: If they served non-utilitarian purposes (e.g., markers of identity, ritual offerings), we would instead observe:

- Minimal use-wear and high morphological variability[19].

- Association with ceremonial contexts (e.g., burials, caches)[20].

Our findings align more closely with the second hypothesis. The operational chains indicate:

[17] FISCHER, A., VEMMING HANSEN, P., & RASMUSSEN, P., «Macro and micro wear traces on lithic projectile points: Experimental results and prehistoric examples», *Journal of Danish Archaeology* 3, Nº. 1, 1984, 19-46.

[18] LOMBARD, M., «Evidence of hunting and hafting during the Middle Stone Age at Sibidu Cave, South Africa: A multianalytical approach», *Journal of Human Evolution* 48, Nº. 3, 2005, 279-300.

[19] BROOKS, A. S., NEVELL, L., YELLEN, J.-E., & HARTMAN, G., ″Projectile technologies of the African MSA: Implications for modern human origins″, In *Transitions before the transition*, *edited by E. Hovers & S. L. Kuhn, 2006, 233-255.

[20] BAR-YOSEF, O., «On the nature of transitions: The Middle to Upper Palaeolithic and the Neolithic Revolution», *Cambridge Archaeological Journal* 8, Nº. 2, 1998, 141-63.

- Ad Hoc Production: Many supports were reused from cutting waste (e.g., splinters from core maintenance), suggesting opportunistic manufacture rather than systematic production for hunting.

- Inefficient Design: Asymmetrical retouching (e.g., concave vs. flat faces) and pressure-flaked edges would hinder aerodynamic efficiency, reducing penetration capability.[21]

Microscopic analysis (40× magnification) further supports this interpretation:

- Utilitarian Tools: Segments and trapezoids exhibit consistent use-wear (FIG.6), typical of composite projectile inserts[22].

- Arrowhead Anomalies: Only 2 of 10 pedunculated specimens (El Alia/Chebba) show use traces; other fractures are Clactonian (Fig. 5), unrelated to impact[23].

**Comparative Perspectives:**

In Capsian/Neolithic assemblages, hunting of medium/large ungulates (e.g., Bos primigenius, Ammotragus lervia) is typically associated with larger weaponry (e.g., spear points, harpoons)[24]. At Haua Fteah (Libya), pedunculated points are rare in faunal-rich layers, instead appearing in symbolic contexts[25].

In Iberian Neolithic sites, arrowheads correlate strongly with cervid hunting[26], but those with minimal use-wear are often linked to burials (e.g., at Cova de l'Or)[27].

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[21] Cattelain P. , "La chasse au Paléolithique supérieur. Propulseur ou arc, ou les deux ?" Dans: *Projectile Technologies : Archaeological, Experimental and Ethnoarchaeological Perspectives*, H. Knecht (Ed.), Plenum Press, New York, 1997.

[22] CLARK, J. G. D., World prehistory: A new outline, 2nd Ed., Cambridge University Press, 1977.

[23] ODELL, G. H., & COWAN, F., «Experiments with spears and arrows on animal targets», *Journal of Field Archaeology* 13, Nº. 2, 1986, 195-212.

[24] LUBELL, D. SHEPPARD, P.- J. & JACKES, M. «Continuity in the Epipaleolithic of Northern Africa with Emphasis on the Maghreb», *Advances in word Arhaeology* 3, 143-191.

[25] BARKER, G., & AL., «The 'human revolution' in lowland tropical Southeast Asia: The antiquity and behavior of anatomically modern humans at Niah Cave (Sarawak, Borneo) », *Journal of Human Evolution* 62, Nº. 3, 2012, 454-465.

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[27] GIBAJA, J.-F. & MAZZUCCO N.,«The use of long blades and projectile points in the Western Mediterranean. Examples from the domestic and funerary sphere», *Journal des sciences archéologiques: rapports* 51 , octobre 2023, 104-109.

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Sicilian Mesolithic examples (e.g., Grotta dell'Uzzo) show similar pedunculated forms, but with clear impact fractures[28]—unlike our sample.

Non-utilitarian arrowheads are documented in Levantine PPNB hoards (e.g., Nahal Hemar)[29], interpreted as votive objects. In Saharan pastoralist cultures, finely retouched points functioned as status markers[30], which is a plausible analogy for our specimens.

While hunting cannot be entirely ruled out, the combined evidence—lack of use-wear, ad hoc production, and inefficient design—suggests a primarily non-utilitarian role. We propose these arrowheads may have served:

- Social Signaling: As markers of group identity or status[31].
- Ritual Deposition: Perhaps as grave goods or offerings, given their scarcity in habitation layers.

Future Directions: Experimental replication to test fracture patterns under ritual vs. hunting scenarios. Refined contextual analysis (e.g., spatial association with burials or ceremonial structures).

**Conclusion:**

For a more comprehensive study of the armatures from the rammadiyat of the southern Tunisian Sahel, it is essential to examine them under a reflective microscope to better understand their function. Further research, including excavations and test pits in the southern Sahel, would be invaluable. A holistic approach would help clarify how raw materials were sourced, how tools were made, and the techniques used in their production. This research should also explore the operational chains and cutting techniques employed by prehistoric populations living in the paralic environments between the sea and lagoon. This region, rich in resources such as land and marine mollusks, likely played a key role in shaping the innovative lifestyles of these populations, influencing hunting, fishing, and gathering practices. Comparative studies would help

[28] TAGLIACOZZO, A., «Archeozoologia della Grotta dell'Uzzo, Sicilia», *Bullettino di Paletnologia Italiana* 84, 1993, 1-278.

[29] Bar-Yosef & Alon (éd.) 1988 – Grotte Nahal Hemar. 'Atiqot. Série anglaise 18.

[30] DI LERNIA, S. « Construire des monuments, créer une identité : le culte du bétail comme réponse sociale aux changements environnementaux rapides dans le Sahara de l'Holocène », Quaternary International, 151, 2006, 50-62.

[31] WIESSNER, P., «Style and social information in Kalahari San projectile points», *American Antiquity* 48, Nº. 2, 1983, 253-276.

reconstruct the precise history of prehistoric settlements along the coast and contribute to a deeper understanding of the region's cultural and technological development.

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**(FIG. 5)** Absence of traces use on arrowheads from Chebba (A) and El-Alia (B)

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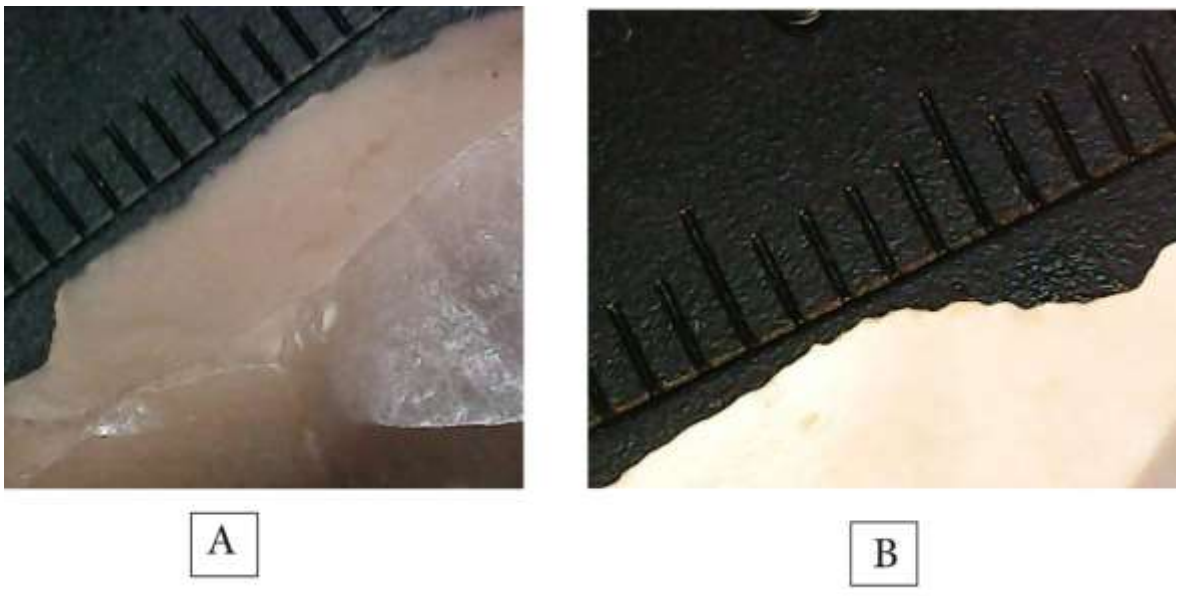


(FIG. 6): Traces of use observed on a microliths from El- Alia (A: bladelett, B. Segment) ©Photo taken by the author

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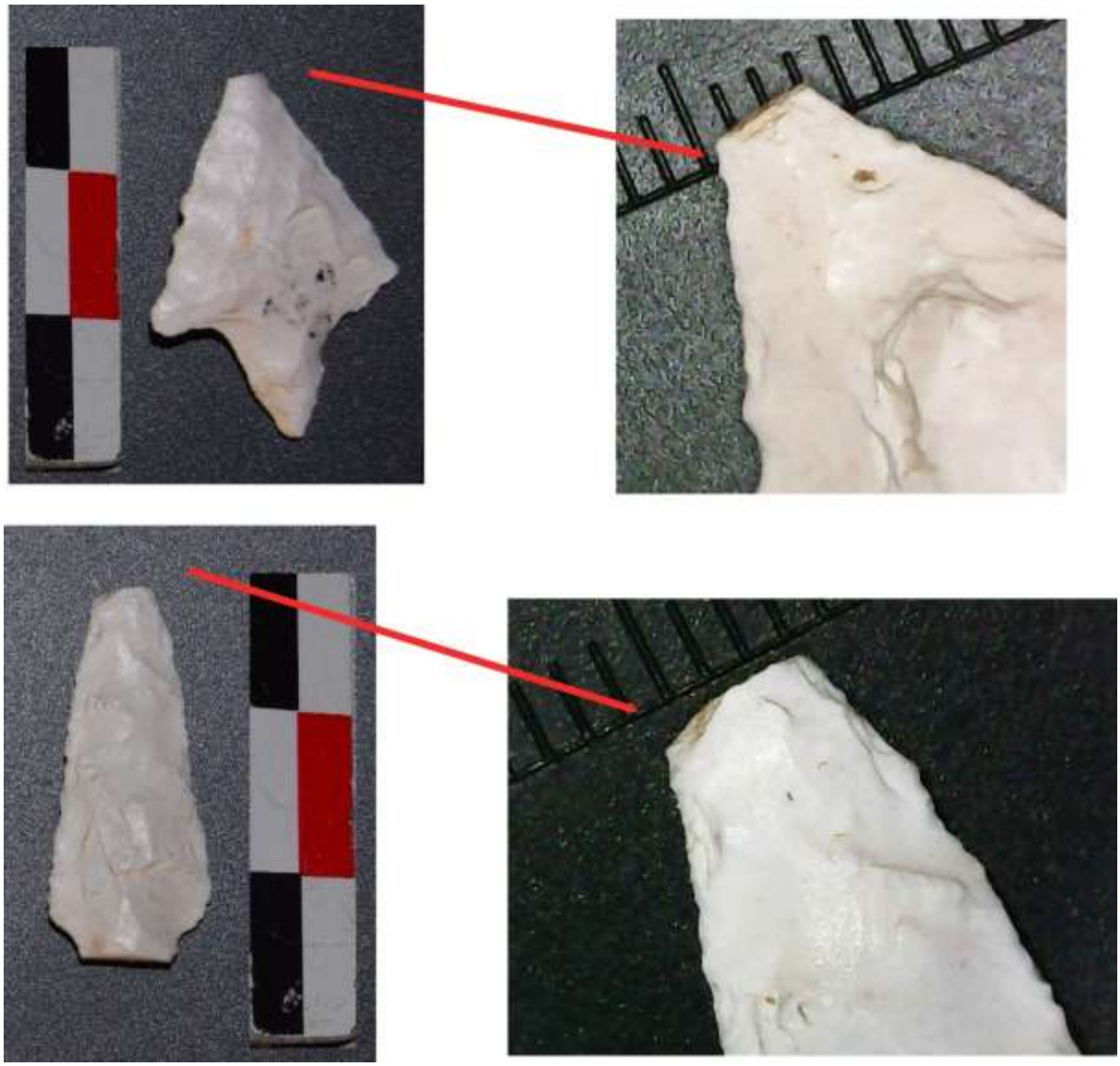

**(FIG. 7):** Traces of use observed on two pedunculated arrowheads from Chebba
©Photo taken by the author

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