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THE USE OF TOOLS MADE FROM WILD BOAR CANINE DURING THE FRENCH MESOLITHIC: EXAMPLE OF CUZOUL DE GRAMAT COLLECTION (LOT, FRANCE)[1]

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The tools made from wild boar canine of Mesolithic attracted the attention since their discovery, but still not subjected to special study. Only technological approaches have recently been applied to them. In order make our knowledge of these tools more complete, it seemed interesting to conduct a use-wear analysis of these tools. The paper presents the results of an in-depth study conducted as a master's thesis of the author according to the collection of Cuzoul de Gramat. This collection contains a large number of the Mesolithic objects recovered on a same site. For this functional approach, an experimental protocol was set up and the use-wear traces of experimental and archaeological tools were compared with each other. It allowed the author to understand how and by what material these tools have been used.

Keywords: archaeology, France, Mesolithic, tools of the teeth, use-wear analysis, experimentations.

Introduction

Upon their discovery, Mesolithic tools made from wild boar canine have been the subject of a particular attention. M. Boule, in a short footnote, proposed to do a *"fossile directeur"* of French Mesolithic (Boule *in* Péquart, Péquart, 1929), but without result. Quickly, functional hypothesis have been venture. They are traduced by different names with a functional connotation, inspired by their morphology. These names can be in relation with their possible function, particularly with a sharp action of tool for the hide work when these tools named *"leather knife"* (fig. 1) (Lacam *et al.*, 1944) or *"stitching awl"* (Péquart *et al.*, 1937; Rozoy, 1978). But it can be associated to their possible functioning with *"drill"* (Lacam *et al.*, 1944), *"awl"* (Barbaza, 1989) and *"burin"* (David, 2005). There are few studies on this kind of tools. Only a complete technological analysis was made by B. Marquebielle for South and East of France collection (Marquebielle, 2014). Another technological approach was made by E. David for North Europe collection (David, 2005). Not real functional analysis was made on this mesolithic tools.

The Cuzoul de Gramat site, in the Lot region (France), was excavated of 1923 to 1933 by R. Lacam and A. Niederlender. After unsuccessful soundings in the cavity, the excavations were made on cave's entrance and in front of porch, who revealed a thick stratigraphy and a mesolithic grave. A good monograph has published in 1944 (Lacam *et al.*, 1944). The excavations started again in 2005 supervised by N. Valdeyron (Valdeyron, Detrain, 2009; Valdeyron *et al*., 2014) and are continued today. The objective was to go back over the old soundings and to spread searches (Marquebielle, this volume). This site gives up, among others, a very important bone industry collection, mainly during old excavations (Marquebielle, 2014).

The first objective of our study was to complete the knowledges on the production and the types of tools made from wild boar canine of Mesolithic with a functional analysis. On mesolithic settlements, these tools are recovered in limited number, except to Cuzoul de Gramat which has 22 objects recovered during old excavations. On the scale of site, our approach enable to identify and to define their function (one or more aims for which one object have made) and their functioning (the action mode of tool, the manner whose it used) (Sigaut, 1991). After, it will be possible to determine if the morphological and typological variety of these tools cause, or not, a

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functional variety and/or different gestures. In this way, we contribute to the comprehension of activities made by mesolithic groups on Cuzoul with these tools. More generally, our study can bring knowledge about mesolithic bone industry. The tools made from wild boar canine, who not exist before Mesolithic, could replace an object or a tool, may be in the objective to adapt for a new function, a new activity or a new material to work.

We search to answer at these questions during our Master (Fabre, 2015) with a functional approach. It has made by the observation and the analysis of use-wear traces (macro and microscopic scale) on archaeological tools, and the constitution of a reference of comparison.

Collection study

Raw material. All objects of this collection are made from inferiors canines of wild boar males and adults. This raw material is obtained with the animal slaughter. During the Mesolithic, the wild boar is a hunting species frequently, but the remains recovered on sites correspond to females and young individuals. So, the purchase made by a different hunting, for a solitary and dangerous animal (Marquebielle, 2014).

The extraction of canines made by the fracturing of the jaw. Most artefacts are made from right canines, only four from left canines. Most of them are made on tooth basis, four on anterior edges, six on vestibular sides and nine on lingual sides.

Composition of collection. This collection is composed of twenty-two artefacts, with various morphologies and sizes. Nineteen objects are beveled, separated in four types according to active part delineation. This typology is defined by B. Marquebielle (*Ibid.*):

three objects with unilateral convex bevel;

three objects with straight bilateral bevels;

four objects with convex-concave bilateral bevels;

seven objects with convex-concave bilateral bevels and spur.

The Cuzoul collection is completed by five artefacts not consider like finished objects: two fragments of proximal part, one undetermined technical state object and two waste debitage (*Ibid.*).

Methodology

Study method. The Russian researcher S. A. Semenov is the first to develope a study method of archeological objects function with the study of macroscopic and microscopic use-wear traces (Semenov, 1964). These works have influenced studies on lithic industry in West Europe in 1970-1980s (Keeley, Newcomer, 1977; Keeley, 1974, 1980; Anderson, 1980; Plisson, 1985; Beyries, 1988). For bone industry, it's from 1980s that functional approaches are realized occasionally, influenced by these of lithic industry (Campana, 1979, 1980, 1989; Stordeur, Anderson, 1985; Peltier, 1985; Peltier, Plisson, 1986). Since 2000s, the studies on this equipment are developed, on a specific tool type (for example Rigaud, 2001; Legrand, 2003; Lompré, 2003) or a specific context (Maigrot, 2003; Manca, 2013).

The functional analysis is made by the observation and the analysis of use-wear traces on archaeological tools, to macroscopic and microscopic scales. The objective of use-wear analysis is to understand the functioning(s) and the function(s) of an object. For to interpret use-wear traces observed on archaeological tools, it's necessary to study references of comparison. It can be realized through ethnographic data study (Semenov, 1964; Beyries, 1993, 1997). However, it's possible to establish a reference of comparison with various experiments (Semenov, 1964). The experimental protocol is set up after a first reading of use-wear traces on archaeological tools. These observations have a repercussion on experimental choices (Maigrot, 2003; Manca, 2013). After this work, the results of comparisons between archaeological objects and reference are analyzed for to propose an interpretation about functioning and function of tools.

Macroscopic and microscopic use-wear traces. The use-wear analysis work through

with two observations steps: macroscopic and microscopic scale. Each step permit to identify and describe different use-wear traces who inform about functioning and function of tool.

The macroscopic traces contribute to determinate the active part localization, the type of worked material and the gesture. The fractures are breaks who are of one edge to other edge of tool (Manca, 2013). The flaking indicate material removals on, generally, the active part (Anderson *et al*., 1987; Maigrot, 2003; Legrand, 2003). They can inform on position and tool action mode according to the localization, the extent, the frequency, their form and size. The roudings are volume alteration, owed to a repeated wear (Campana, 1989). They are generally present on active part, on the edge or the sharp edge. They enable to localize the active part and inform on the gesture and the type of worked material (Maigrot, 2003). The striations owed to use-wear came tool action on worked material and the gestures (Peltier, 1985; Peltier et Plisson, 1986; Christidou, 1999; Maigrot, 2003). Some use-wear traces show the density of worked material who is either superior or equal to these of tools: the flattening and the material moving (Sidéra, 1993). The localization and the morphometry of these use-wear traces inform of tool action mode and the worked material density (Maigrot, 2003).

The microscopic use-wear traces enable to complete previous observations. The micro-polish is a surface alteration owed to repeated contact between tool and worked material. Their observation and description permit to localize the contact zone with the worked material, so the active part, but also to inform about nature, state and use time (Plisson, 1985; Peltier, Plisson, 1986; Christidou, 1999; Maigrot, 2003). The microscopic striations are the same results that in macroscopic scale. The micro-flaking indicate wear sliver, like flaking, to macroscopic scale (Maigrot, 2003).

Experimental approach

Experimental protocol.

a. Experimental tools production.

The raw material.

The raw material acquisition is make during hunting season. Inferior jaws of males and adults wild boar had recovered. The canines size depend of wild boar weight, from 60 to 110 kg. In all, seventeen jaws are recovered and two wholes canines. After, the canines are extract with the help of modern tools.

The experimental tools fabrication.

The technological study makes by B. Marquebielle (Marquebielle, 2014), about tools made from wild boar canine of Cuzoul de Gramat, guide us for the experimental tools fabrication.

- *Debitage* : Some archaeological tools made from wild boar canine of Cuzoul de Gramat have obtained by a debitage method by bi-partition[2] (Marquebielle, 2014), for to obtain two blanks at least with few waste. Firstly, it's implement by a longitudinal grooving realized on the all length in posterior face, on the part where the canine is hollow. Secondly, the canine is separated in two by fracturing in indirect percussion**,** with the help of a intermediary piece in deer antler insert in the grooving at a right angle to tooth. The experimental tools are removed with this method (fig. 2). Some tools have traces of this step: a groove side and/or negatives of flaking. The blanks obtained morphology are either rectangular or triangular. Their size vary according to canine size.

- *Shaping* : the active part of experimental tools are shaped by longitudinal scraping in inferior face, like archaeological objects, who permit to set up and make uniform the active part faces.

b. Experimental choices.

Proceeding of experimentations

Six tools are for each experimentation: three are used with a flat ranke angle and the three other with an obtuse ranke angle. The change of inclination enable to see difference use-wear extent and to identify the contact angle during use. Another variant taking into consideration, each tool is used in all one

[2] For osseous technology terminology and its translation, see Averbouh, A., 2000; Averbouh, A. (dir.). 2017.

hour and two observations steps are made, to ten minutes and to sixty minutes, for to see the use development (fig. 3).

The worked materials

The animals materials (fig. 4)

The animals soft materials (fig. 4: 1): Upon their discovery, the mesolithic tools made from wild boar canine had interpreted like hide worked tools. For to confirm or to deny this hypothesis, it would be necessary to characterize use-wear traces of hide work and to compare experimental traces with archaeological traces. We have recovered a piece of cow hide, of the neck. After to have fleshed with a flint sliver, it was leaved in coarse salt during one week. When salt particles are removed, the hide have tanned with smoke. The experimentation had consisted to hide softening, with tools made from wild boar canine used with unidirectional gesture.

The animals hard materials (fig. 4: 2):

A experimentation had oriented toward the work of animals hard materials and more particular of bone. This work with tools made from swine canine is attested in ethnographic context, at Irian-Jaya hunter-gatherers in Indonesia (Maigrot, 1995, 2003). Bone equipment on Cuzoul site is composed for the most part to awls. For the experimentation we have recovered fresh long bones of domestic boar (humerus and radius). The experimental tools have worked fragments of these bones by longitudinal and unidirectional scraping.

The vegetals materials (fig. 5)

The vegetals supper materials :

A first experimentation have realized with green nettles, previously flip through, for tellis sliding the tools on stems with a slight pressure of thumb.

A second experimentation have made for bramble work, for to link the use of tools made from wild board canine to basketry activities. For this experimentation, spines are removed and the objective was to removed fibers for to recovered stems. The bramble was placed on thigh, the tool lean on it and it was pulled between two.

The vegetals soft materials:

Four experimentations have made on wood: two on hazel and two on pine. The choices of these varieties have make in basis on anthracological studies on Cuzoul site by A. Henry (Henry, 2011). Two experimentations have made on green hazel. A first consist to remove bark on branches, the tools used laterally by longitudinal and unidirectional scraping. During the second, these same branches have grooved in way of vegetables fibres and the front of tools used (fig. 5: 1). Then, two steps of green pine transformation have experimented, always with an unidirectional gesture: remove the bark and scraping the branches (fig. 5: 2, 3).

The vegetals hard materials:

The oak work had choose because this taxon is very present on Cuzoul site (Henry, 2011). It had worked dry and previously the bark had removed for, with the experimental tools, to regular the wood surface, by longitudinal scraping in the way of vegetables fibres (fig. 5, 4).

Synthesis of experimentations

a. Comparisons between experimentations

Wood worked

In all, three experimentations on wood worked are make: the grooving of green hazel, the scraping of dry oak and green pine. The wear is marginal and few extended. The use-wear traces are the same for three: a marginal and rounded blunting, few flakings with distinct endings, a micro-polish with distinct and regular contour, striations numerous, shorts and superficial. The use of dry oak work is more flat and less extent that these of green hazel. In fact, the green wood give a wear more extent and intrusive that dry wood (Maigrot, 2003).

Hide worked

Through the similarity of use-wear traces, we can make comparisons between tools for green pine work and tools for dry hide. In two cases, the blunting is rounded, the flakings are few, irregulars and with distinct endings, the micro-polish is

continuous, with a distinct and irregular contour. The wear localization is different (a contrary to the extent who is marginal for two): unifacial for pine and bifacial for hide.

Bark worked

Two experimentations inform on bark work: the scraping of hazel and pine branches. Same use-wear traces are saw like a rounded blunting, flakings few presents or not, a micro-polish slight, unifacial, with distinct and irregular contour on a micro-relief in plateau effect and striations very numerous and various. However, some differences are underlined. The remove of pine bark cause a more extent and intrusive wear that hazel, this is probably due to thickness and hardness of bark who is more important. The tools active part surface is more affect and striations more various.

The results observed on tools working bramble can be made comparison with tools for green hazel bark. In fact, the use-wear traces are the same, may be because of the bark and brambles fibre are thin, supper and tender.

Bone worked

The fresh bones scraping cause on tool a rounded blunting, few flakings, a micro-polish with a blurred and irregular contour on a micro-relief in plateau effect, striations are few numerous, shorts and deeps. The bone worked modified the tools surface, on marginal extent and wear affect only elevation.

b. Tools inclination

The experimentations show that inclination of a tool influence the use-wear development. In fact, the tools used with a flat ranke angle have a wear extant on lower face without effect on active part edge. For the tools who used with an obtuse ranke angle, the wear is localized only on active part edge or sharp edge. The choices of tool inclination have an impact on localization and extant to wear, without influence on use-wear traces.

Archaeological tools interpretations

The comparisons between experimentations enable to show resemblance of functional signatures between same material type (wood, bark, bone) but also between materials with similar nature (supper, soft, hard). This results analysis contributed to interpretation of mesolithic tools made from wild boar canine of Cuzoul de Gramat.

The archaeological tools functioning

The all archaeological tools are used laterally. The three objects with straight bilateral bevels are also a wear on distal part. The active part of tools is mostly to convex deli-neation and extent on the half or more to edge length. The objects with convex-concave bilateral bevels and spur have been differents names referring to pierce action: "*drill"* (Lacam *et al.*, 1944), "*awl*" (Rozoy, 1978; Barbaza, 1989). A contrary to this functional hypothesis, link to their morphology, the tools of Cuzoul not have used like this, the wear not being developed on spur but always on convex edge.

The tools experimentation with two different inclinations enabled to understand that archaeological tools have used with a flat even obtuse ranke angle. In fact, the wear extend on the edge and lower face, like experimental tools used with a flat ranke angle. The ranke angle is probably a few more important but stay few open.

The archaeological tools function. To understand in what kind of works the tools of Cuzoul de Gramat have been used, we compared the observations on archaeological tools with these of expiremental tools. Some use-wear traces can to correspond, or to be similar, of the experiment use-wear traces.

The hide work

Two object with convex-concave bilateral bevels present use-wear traces corresponding to dry hide work (fig. 6). They have a rounded bifacial dissymetric blunting and a unifacial micro-polish with a blurry and irregular contour. This two tools have use-wear traces reminding the experimentation on softening of dry hide. It's possible that the transformation step of hide is different but use-wear traces correspond to a unidirectional scrape to worked material.

The osseus material work

Two objects with straight bilateral bevels seem to have used for a osseus material work (fig.7). They have a blunting marginal and flattened. The macroscopic striations are numerous, shorts and deeps. The microscopic striations are few numerous, shorts and superficial. The micro-polish is unifacial with a blurry delineation. All these traces correspond to a unidirectional scraping gesture of worked material.

The wood work

The use-wear traces present on an object with convex unilateral bevel can correspond to wood work. Except the bifacial dissymetric and rounded blunting, the other traces are similar to experimental tools on wood work. Macroscopic and microscopic striations are numerous, discontinuous, shorts and superficial. The micro-polish is slight, unifacial with a distinct and regular contour.

The undetermined function tools

For the eleven other tools, we can't be determined a precise function because the use-wear traces are different to this of experimental tools. Two tools groups can be highlight, gathering objects with same use-wear traces and so a same function, without can determine the worked material. However, we can show that they don't worked vegetal materials (vegetables fibers, wood, bark) because traces do not correspond to experimental tools. A first group gather five tools : one object with convex-concave bilateral bevels and four objects with convex-concave bilateral bevels and spur. A second correspond to two objects with convex-concave bilateral bevels and spur having worked a soft material, for a same function. Four tools can be associated to this two groups, each present different use-wear traces and used on a different material.

The unused objects

In all, six objects have been used: one object with convex unilateral bevel, two fragments of indetermined beveled object, one undeterminated technical state object and two wastes debitage.

Handling and hafting question. The most of all Cuzoul tools present, in superior face, a covering polish with grained aspect. This remind prehension traces on experimental material and so this can mean that archaeological tools was hold manually. The possible use-wear traces of prehension on other tools are negligible or they can be distinguished of taphonomical traces.

Some tools ask by some traces who can suppose a hafting. In fact, three objects with straight bilateral bevels present a tongued fracture plan in proximal part, it's can be linked to use and may-be to their hafting. Two objects with convex-concave bilateral bevels and spur present, on lower face in proximal part and on the edges, a blunting and micropolish associated to thin and longitudinal striations. The localization and morphology of these traces are different than the ones on active parts. The presence of a haft could be an explanation, however this is an hypothesis we have to check by experiment.

Conclusion and perspectives

This study enable a better comprehension of these Mesolithic tools, known only with technological approach. Mesolithic groups had a particular attention on this tools because they are the result of specific choices. Firstly it's the choice of raw material, specific and a difficult access. Secondly, the finished objects was obtained after a long transformation scheme, for to have flats blanks from wild boar canine. The morphological various is important and separate finished objects in different types (Marquebielle, 2014).

Our study underlined the various categories of activity make by mesolithic groups on the Cuzoul de Gramat. The tools made from wild boar canine have been used of homogeneous manner, like lateral “scrapers”, in positive cut with abrupt to oblique angle and with a unidirectional gesture. A tool type, the objects with straight bilateral bevels, have been choose by mesolithic for the work of half-hard and hard material. The other types have been used on soft material work, but the differences in use-wear traces show that they were different materials and so with various objectives. So, their function is

different according to their morphology and also inside each tools type.

The use-wear analysis of mesolithic tools made from wild boar canine and their results have to be completed. In fact, our experimental protocol should be developed. This will be contribute to define more precisely activities realized to Cuzoul de Gramat, and to clarify which is/are the function(s) of each types. Moreover, it will be interesting to increase this use-wear analysis to other French Mesolithic sites with tools made from wild boar canine. That enable to make a comparison with Cuzoul de Gramat collection and more to understand if tools have been used with the same manner and for which functions.

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ИСПОЛЬЗОВАНИЕ ОРУДИЙ ИЗ КЛЫКА ДИКОГО КАБАНА В МЕЗОЛИТЕ ФРАНЦИИ: НА ПРИМЕРЕ КОЛЛЕКЦИИ ИЗ КУЗОЛ ГРАМА (ЛОТАРИНГИЯ, ФРАНЦИЯ)[3]

Э. Фабре

Мезолитические орудия, сделанные из клыка дикого кабана, привлекли внимание с момента их открытия, но до сих пор не подвергались специальному изучению. В статье представлены результаты углубленного изучения коллекции мезолитических изделий из стоянки Кузол Грама. Для проведения функционального анализа автором был разработан протокол экспериментов и выполнены сравнительные наблюдения поверхности экспериментальных и археологических орудий. Это позволило автору выяснить, каким образом, и по какому материалу эти орудия использовались.

Ключевые слова: археология, Франция, мезолит, орудия из клыков, трасологический анализ, эксперименты.

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Fig. 1. Example of tool interpreted as "leather knife", recovered on Cuzoul de Gramat site (Lot, France).

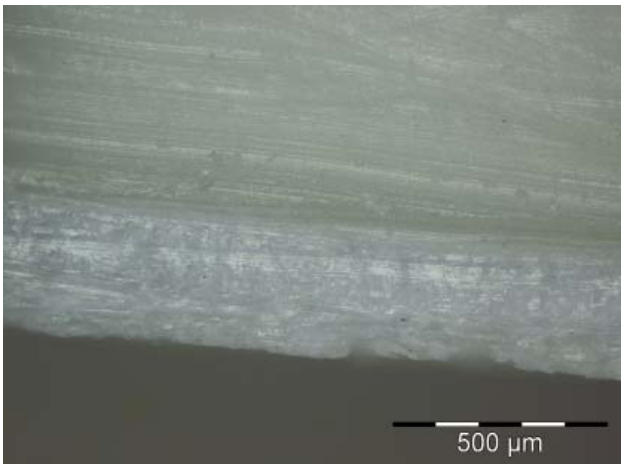
[3] Исследование выполнено при поддержке совместного российско-французского гранта РГНФ (проект 14-21-17003/Fra) и Национального фонда научных исследований Франции (CNRS) «Особенности кости как одного из основных видов сырья и значение костяной индустрии в древних культурах Евразии» в рамках работы международной группы исследователей CNRS “Prehistoric exploitation of osseous materials in Europe” (GDRI PREHISTOS)..

a

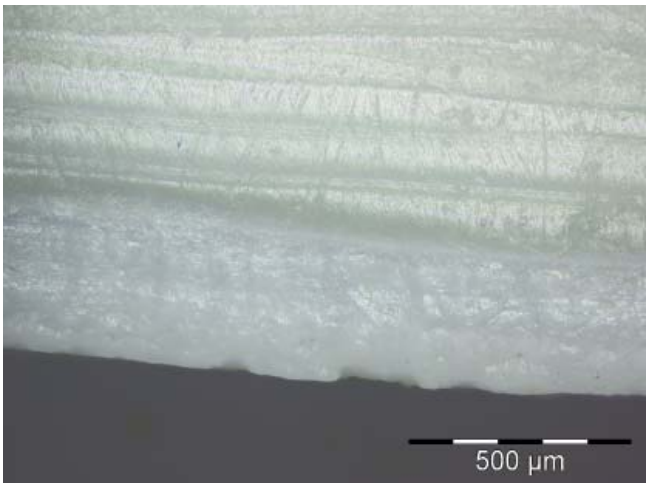
b

c

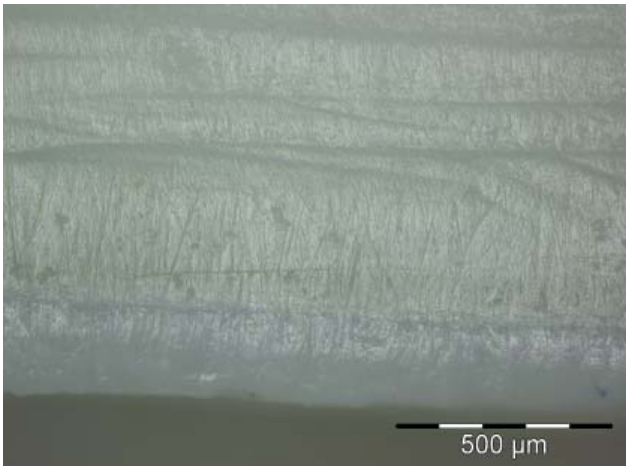
Fig. 2. The two experimental steps of the debitage of a wild boar canine:
a) longitudinal grooving; b) indirect percussion.



a



b



c

Fig. 3. Example of use evolution on a same experimental object used for bark worked:
a) before use; b) after 10 minutes of use; c) after 60 minues of use.

a

b

Fig. 4. Experimental use of wild boar canine tools on animal materials: a) on dry hide; b) on fresh bone.

a

b

c

d

Fig. 5. Experimental use of wild boar canine tools on vegetal materials:
a) grooving of green hazel, b) removing of pine bark; c) scraping of green pine branches;
d) scraping of dry oak branches.

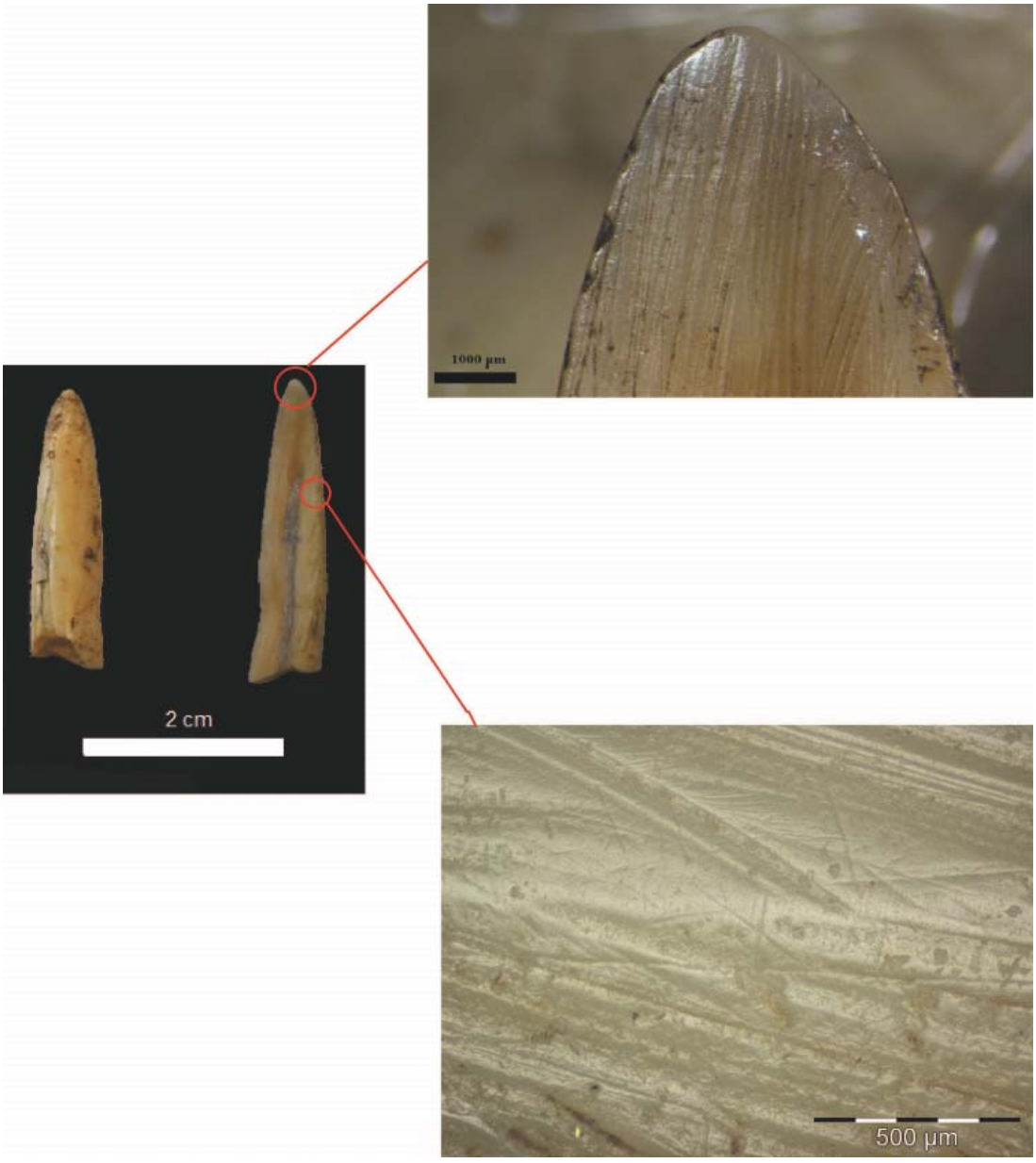


Fig. 6. Tool used for hide worked (×10 and ×100).

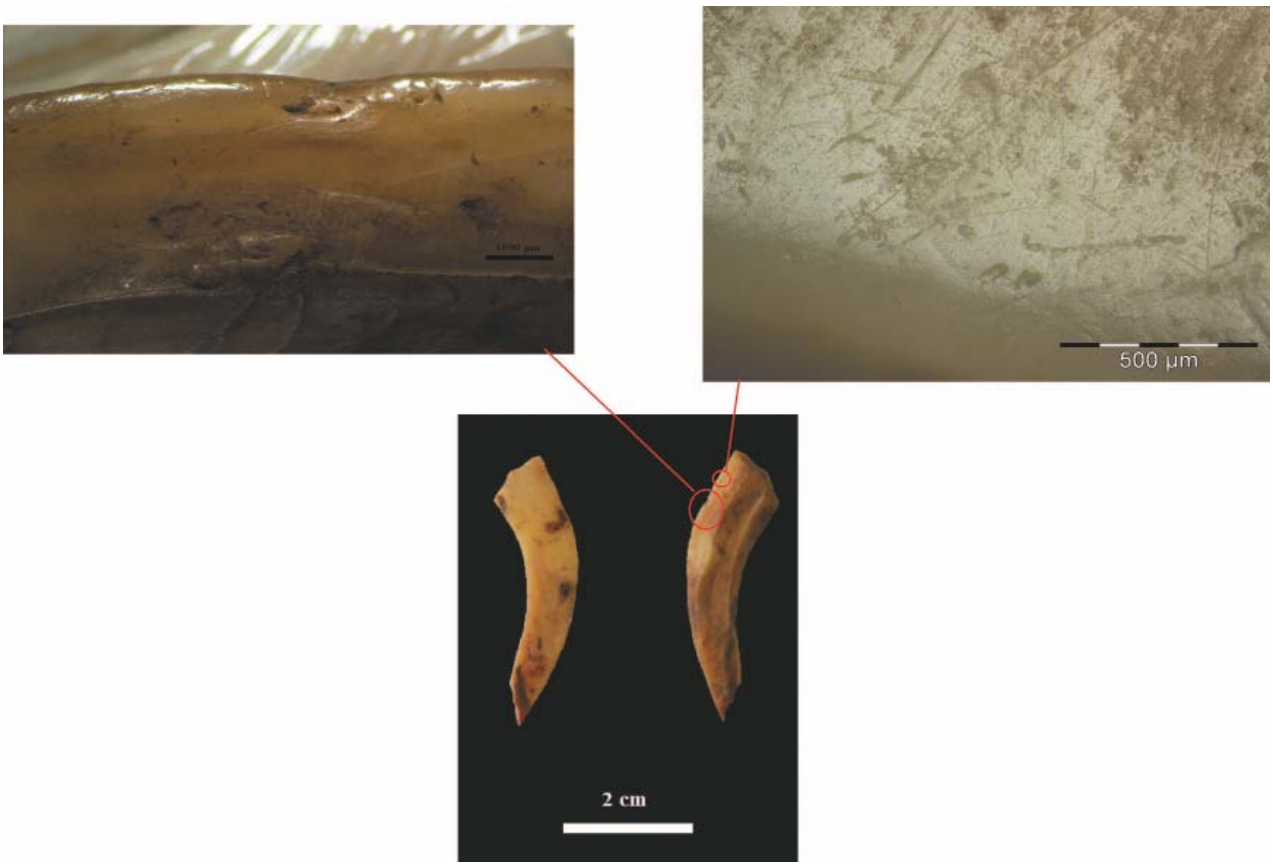


Fig. 7: Tool used for osseous material worked (×10 and ×100).