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Cultivated plants craft in Classic Maya society: experimental and functional approach of the gourd work with obsidian blades

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CONTEXT

Archaeological data show that calabashes (genus *Cucurbita* and *Lagenaria*) were among the most cultivated plants in pre-Columbian times. They are part of the oldest domesticated species and their presence is attested in all the sites (where the conditions of conservation allow it), which shows their importance in the pre-Hispanic societies (Cutler and Whitaker, 1961). Ethnographic data reveal that these gourds are still used in Central America and Amazonia (Moreira and al., 2017). These calabashes are manufactured by a craftsman (often specialized) who empties, shapes and decorates these fruits to transform them into artefacts. These objects had several uses: daily utilization (e.g., containers, dishes, fishing, musical instruments...) and ritual usage (e.g., masks, body ornaments, sacred vessels...) (Hartman, 1910).

How to highlight treatment of calabash in pre-Hispanic times in Mesoamerica?



Modern use of calabashes as containers (picture: Claudia Novelo Alpuche)



Experimental calabash work

METHODS

The conservation of vegetal materials across centuries is difficult. On the contrary, lithic artefacts can be founded in archaeological context: these tools were central in the daily life of the ancient Maya, who did not use the metal in the Classical period (250-900 / 1000 AD). The methodology published by Semenov (1964) allows to highlight topographic modifications on the tool's micro-surface. An experimental approach coupled with macroscopic and microscopic analysis enables to identify the processed material and the technical gesture. To identify this type of activity on archaeological tools, it is important to develop an experimental protocol on the treatment the calabash.

Jaime Carillo, a craftsman specialized in the pyrography manufacturing of gourd, has agreed to reproduce decorations observed in ethnographic objects by engraving with obsidian blades. Two experimental obsidian blades (n°2 and n°8) fitted with a deer skin, and a flake (n°55) were selected by the craftsman. The calabash was worked for more than 11 hours with bidirectional longitudinal movements, and alternating the three tools (n°2: 2 hours 30', n°8: 8 hours and n°55: 54').



detail of the calabash work

RESULTS

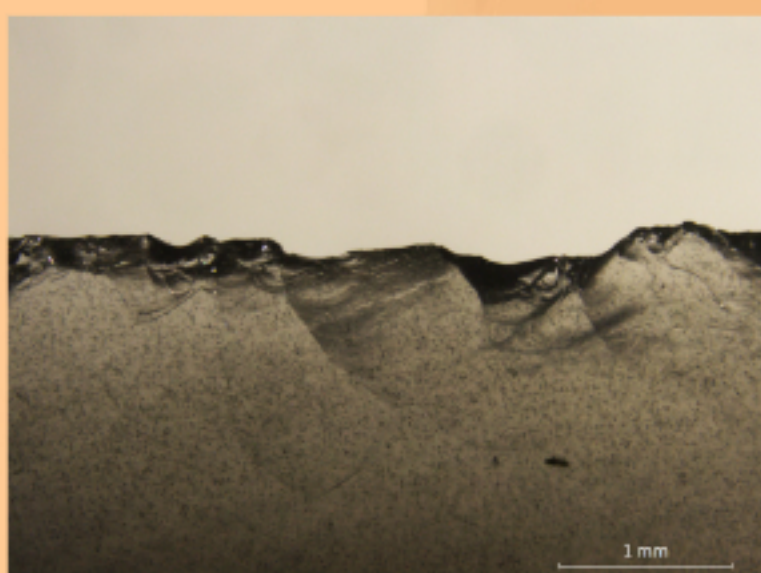
This experiment has produced traces of use on obsidian blades. In comparison with an experiment made on another plant species (cedar): it is possible to highlighting characteristic use-wear of calabash treatment (edge-rounded and striations), and common to these two vegetable matters (scars).

Scars	CALABASH	CEDAR
Disposition		
unifacial		
bifacial	x	x
lined up	x	x
superimposed	x	
Form		
semicircular	x	x
crescent moon		x
triangular		
quadrangular		
irregular		
Initiation		
bending	x	x
cone		
Termination		
thin	x	x
reflected		x
step	x	x
transversal		

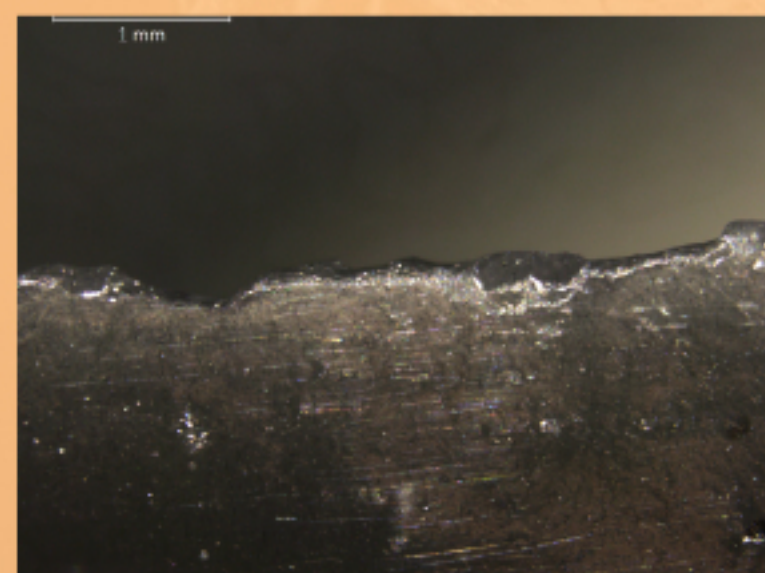
Edge rounding	CALABASH	CEDAR
disposition		
symmetrical	x	x
asymmetrical		
high locations	x	x
low locations		
aspect		
flat		x
rounded	x	
intensity		
low	x	
high		x

Abrasion	CALABASH	CEDAR
topography		
high locations	x	x
low locations		x
continuity		
yes		x
no	x	
development		
marginal	x	
extensive		x
grains		
homogeneous	x	x
heterogeneous		
thin		x
moderate	x	
large		

Striations	CALABASH	CEDAR
quantity		
rare	x	
numerous		x
aspect		
continuous		x
discontinuous	x	
straight-lined	x	x
sinuous		
shorts	x	x
larges		x
superficials	x	x
deeps		x
bottom		
smooth		x
rough	x	x
superimposed		
yes		x
no	x	

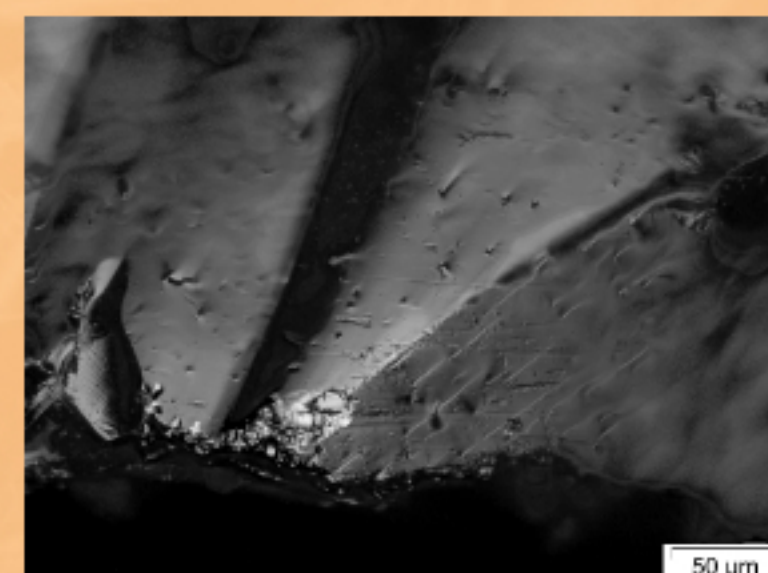


Blade n°8 (calabash) with details of scars (x25)

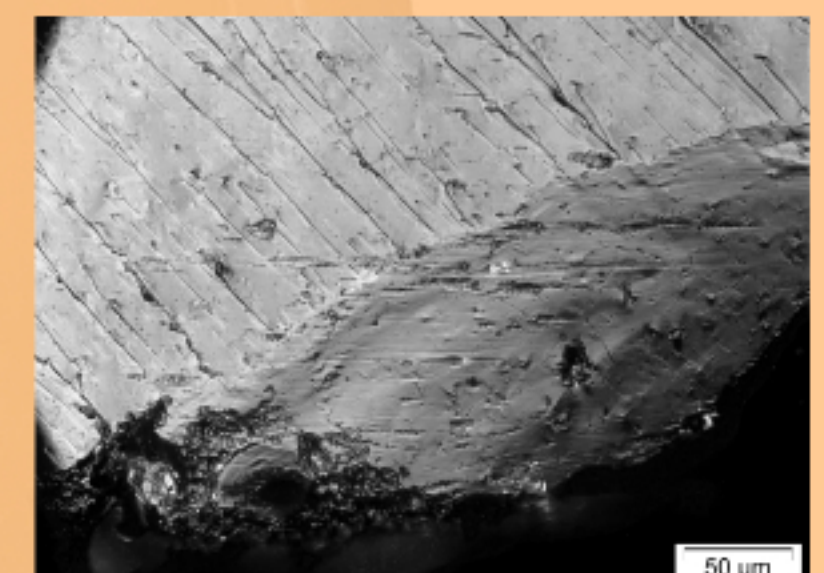


Blade n°29 (cedar) with details of scars and edge rounding (x25)

MACROSCOPIC SCALE
MICROSCOPIC SCALE



Blade n°2 (calabash) with details of striations and abrasion (x200)



Blade n°17 (cedar) with details of striations and abrasion (x200)

PERSPECTIVES

The experimental protocol tested on calabash and cedar represents a first step for the building of a frame of reference for the treatment of vegetable material. Further developments will allow to identify criteria to distinguish different vegetal species on the archaeological tools.

Thanks to the analysis of the lithic collections of the Mayan civilization in Classical period, we hope to bring new information on the interactions Humans/Environment and the exploitation of plant resources (in particularly arboriculture).

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