

Cannabis for Mammoths

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ABSTRACT

Several elements presented in this paper suggest that Epigravettian Hunter Gatherers of Mezhirich (Межиріч, Ukraine) used the *Cannabinacea* species, hemp (*Cannabis*) and hop (*Humulus lupulus*), to feed, tame and sedate mammoths leading to a radical change in the herd age profile. Furthermore, this paper also demonstrates that there are similarities between the engraved mammoth tusk found in Mezhirich and the painted stones found in *Riparo Villabruna* and *Riparo Dalmeri* (Epigravettian rockshelters, Italy) suggesting a following migration.

RESUME

Plusieurs éléments présentés dans cet article suggèrent que les chasseurs cueilleurs épigravettiens de Mezhirich (Межиріч, Ukraine) ont utilisé les espèces de *Cannabinacea*, le chanvre (*Cannabis*) et le houblon (*Humulus lupulus*), pour nourrir, apprivoiser et calmer les mammoths, entraînant un changement radical du profil d'âge du troupeau. En outre, cet article démontre aussi qu'il existe des similitudes entre la défense de mammoth gravée trouvée à Mezhirich et les pierres peintes trouvées à *Riparo Villabruna* et *Riparo Dalmeri* (abris sous roche épigravettiens, Italie) suggérant une migration ultérieure.

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1. Rural landscape and mammoths

The Epigravettian open air base camp of Mezhirich (Межиріч or Mejyritch, Middle Dnieper basin, Kaniv District, Cherkassy, 14.9- 14,3 ka 14C BP¹) was composed of several large dwellings made of mammoth bones², outer pits filled with faunal remains including mammoth, hare and fox³. Inside the dwelling 1, close to the entrance, has been retrieved the fragment of an engraved mammoth tusk (21 cm length, 11 cm width) conserved in Natural History Museum of Kiev.

Separated by long, thin and deep longitudinal lines, five levels of geometrical engravings cover the convex and smooth surface⁴. A small depression at the centre of its lower part is marked by zigzag patterns flanked on the left by vertical lines. This specific pattern is comparable to similar longitudinal, vertical and equidistant furrows appearing on the eastern side of a field overlooking the village of *Khmil'na*, between *Kaniv* and *Mezhirich* (lat: 49°39'58.84"N, long: 31°29'14.90"E). Like the geometric lines on the tusk, the vertical furrows are close to a depression paced by creeks draining the field towards a canal plunging in the village (Figure 1). On the western side of the field, dried creeks are similar as the oblique lines engraved on the upper level of the tusk.

The *Khmil'na* field and the tusk proportions being globally similar, it appears that the engraver has voluntarily chosen

the tusk fragment for the representation (Figure 2). The painted mammoth skull retrieved in the same dwelling is another example of a voluntary use of the anatomy to represent the *Khmil'na* field. The ochre red lines imitate the field topography and retake some elements represented on the tusk. This element suggests that the mammoth was, somehow, linked to the activities occurring in the field.

2. Cannabinacea

A first hypothesis involving only the drying of hay on ropes could be proposed to explain the shape of engraved central motifs. Nevertheless, the local toponymy surrounding the field of *Khmil'na* rather suggests that the area has been particularly focused on the production of *Cannabinacea*. The name of the close city of *Kaniv* (Канів, Cherkassy, Ukraine) is homonymous of *Կանուտի [kanep'] (Armenian), **kənaf* (Azeri) or **كنف* [*kanab*] for "hemp" while *Kononcha* (Кононча) shares the same root word as **конопель* [konopel'] (Ukrainian) or **konopí* (Czech) for "hemp" and, by extension, survived in **गन्जा* [gañjā] for "hemp" (Sanskrit). The village of *Khmil'na* is called after *Хмілень* [Khmil'na] (Ukrainian) for "drunk" or "intoxicated".

The *cannabinacea* family is composed of hemp (*Cannabis*) and hop (*Humulus lupulus*). If the local toponymy suggests the presence of the first, the engraved

¹ "AMS 14C suggest a short chronology of the Epigravettian settlements, between 15 and 14 ka BP. (Groningen and Oxford laboratories, unpublished data)". Extracted from Marquer, L. et al. (2012)

² Four mammoth-bone dwellings in Mezhirich have been made from the bones of at least 149 animals, Soffer (1985); Soffer et al. (1997)

³ Péan, S. (2015)

⁴ About Mezinian Art see Iakovleva, L. (2009)

vertical lines of the upper levels represent similar installations as those found in modern hop fields. There, the hop is growing vertically along ropes hanging on poles instead of covering the soil naturally (Figure 3). At each end of the central level, an installation is surmounted by a circle representing a female hop cone while the two central installations not, suggesting that they are males (Figure 3).

Bracteoles of female hop cones produce a yellowish and bitter dust called *lupulin* used in modern beer composition and well known for its notorious sedative properties⁵. The field representations on mammoth tusk and skull suggest that Hunter Gatherers gave lupulin to the big mammals. However, because of the toponymy, the cultivation of hemp (*Cannabis sativa*) is not excluded in the area. Well known for its tetrahydrocannabinol (THC) anti-inflammatory properties⁶ and its essential fatty acids enriching mammals' milk⁷, the culture of hemp could have decreased the death rate in young mammoths and radically changed the age profile of the Mezhirich herd from now on essentially composed of individuals between 0-20 years⁸.

3. Migrations and specialization

The motifs engraved on the tusk of Mezhirich (14.9-14,3 ka 14C BP⁹) and the painted mammoth skull predate similar paintings found in the Epigravettian rockshelters of Villabruna¹⁰ (c. 14 Kya, *Riparo Villabruna*¹¹, Belluno, Italy) and Dalmeri (Grigno, Trentino, Italy). The stone n°2¹², covered with zigzag patterns, and the stone RD 082 (Dalmeri Rockshelter¹³) recall the zigzag motifs of the Mezhirich tusk marking the drainage area of the *Khmil'na* field (Figure 4). Painted stones RD 006 and RD 007 of Dalmeri are reproducing the creeks and the drainage of the field with similar lines as those painted on the mammoth skull found

in the same dwelling as the engraved tusk (Figure 5). Finally, it is here considered that the stone (RD 241) represents a pachyderm (Figure 5).

These motifs appeared in Central Europe simultaneously to the individual *Villabruna*¹⁴ who carried both the MtDNA U5b2b and the Y-DNA R1b hp. He inaugurates the apparition of a new male lineage among Epigravettian individuals carrying the Mitochondrial DNA U5b2¹⁵ firstly positioned in Southern Europe¹⁶ during the post Last Maximum Glacial period. The latter migrated towards the Northern Black sea during the Late Glacial period and reached the Dniepr basin¹⁷, Transcaucasia, Fertile Crescent¹⁸ and reached the Lake Baikal¹⁹.

4. Discussion

The deciphering of the Mezhirich engraved tusk completes the range of theories explaining the disappearance of Mammoths in the Eastern European plain²⁰ by proposing the hypothesis of an attempt of breeding leading to an overexploitation of mammoth herd. It also opens new perspectives on the development of a European sustainable agriculture in hostile environment long time before the diffusion of the Neolithic model and questions the chronology of cultivated *cannabinacea*²¹.

This paper also suggests that the Epigravettian Hunter Gatherers already possessed advanced botanical knowledge necessary to trigger domestication and breeding big mammals questioning the largely agreed theories about big game hunting strategies during Epigravettian. Furthermore, the Epigravettian presence in Transcaucasia confirmed by the site of Kalavan-1 (c. 14 Kya B.P)²², and the migration in Fertile Crescent of the carriers of the MtDNA U5 haplogroup questions the origins of domestication.

⁵ Schiller, H & Forster, A & Vonhoff, C & Hegger, M & Biller, Andreas & Winterhoff, H. (2006)

⁶ See tetrahydrocannabinol (THC) anti-inflammatory properties in Nagarkatti, P. et al (2009)

⁷ Enriched in mono and polyunsaturated fatty acids (omega6 and omega3), Chilliard Y., Ferlay A., Doreau M. (2001)

⁸ Age profile established according to the system developed by Saunders (1977) in Shipman, Pat. (2014)

⁹ "AMS 14C suggest a short chronology of the Epigravettian settlements, between 15 and 14 ka BP. (Groningen and Oxford laboratories, unpublished data)". Extracted from Marquer, L. et al. (2012)

¹⁰ Broglio, A. (1992)

¹¹ Found in 1988 by A. Broglio. About see Broglio, A. (1992), Aimar, A. et al. (1992)

¹² See figures in Aimar, A. (1992)

¹³ See catalogue, Dalmeri et al. (2011)

¹⁴ Individual Villabruna1, MtDNAU5b2b hp, Y-DNAR1b hp, Fu, Q. et al. (2016)

¹⁵ About MtDNA U5 hp in Italian Peninsula, see Malyarchuk et al. (2010)

¹⁶ Individual Paglicci71, carrier of MtDNA U5b2 found in layer 8A associated with Evolved Epigravettian culture, in Posth et al. (2016)

¹⁷ Mesolithic individual from the Vasilyevka III cemetery, burial 37, Ukraine_HG1, Kunda Culture, 11,143–10,591 cal BP, MtDNA U5b2 hp, Jones et al. (2017)

¹⁸ U5 lineages, although rare elsewhere in the Near East are retrieved in northern Fertile Crescent populations like Kurds, Armenians, and Azeris, Richards et al. (2000)

¹⁹ Carriers of MtDNA U5 sub- hps have reached west Lake Baikal before or during the Neolithic in Moeder, K. P. et al. (2006)

²⁰ Stuart, A.J. (2005)

²¹ Godwin, H. (1967); Li, H-L. (1974); Lu, X. & Clarke, R.C. (1995); Liu, F.H. et al. (2017)

²² Open air seasonal site of Kalavan-1, see Tornero et al. (2016)



Figure 1: localization of places cited in the text.



Figure 2: Proportions" comparison between the field of Khmil'na (Google Earth 2021), with enhanced positions of creeks and furrow, and the Mezhirich tusk (photo Iakovleva. 2009). On the right, a reproduction of the mammoth skull found in the Mezhirich dwelling-1 (Angouleme Museum).

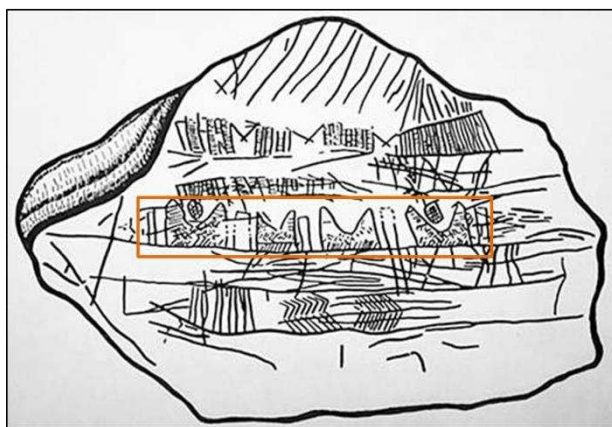


Figure 3: A drawing of the engraved mammoth tusk of Mezhirich (Kiev Museum) compared to hop field pictures before and after harvesting. Below, an engraved motif compared to one hop in field context.

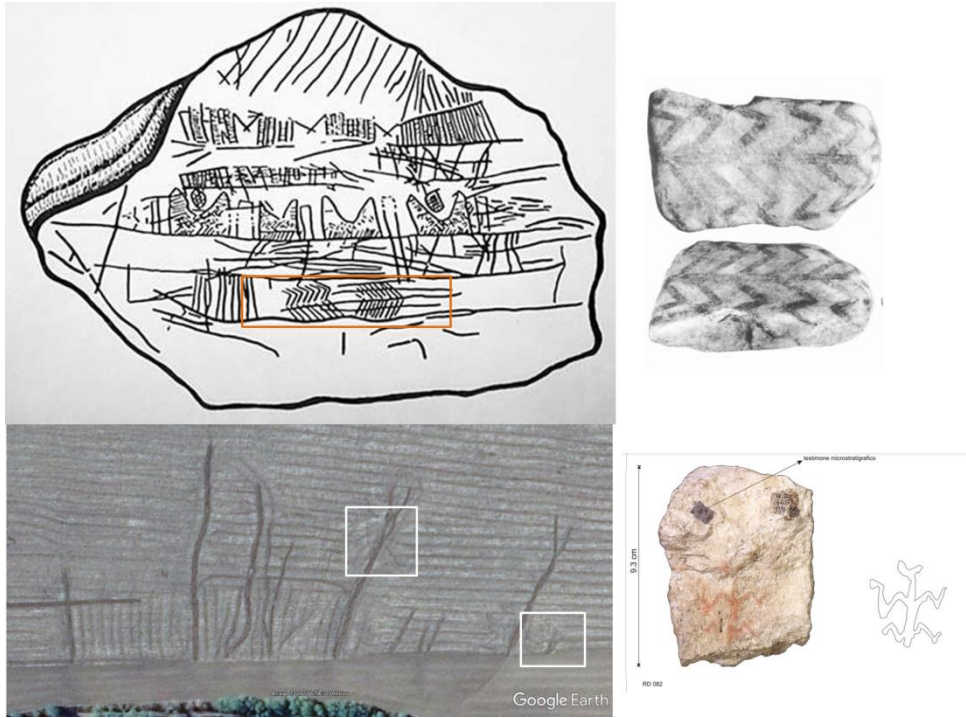
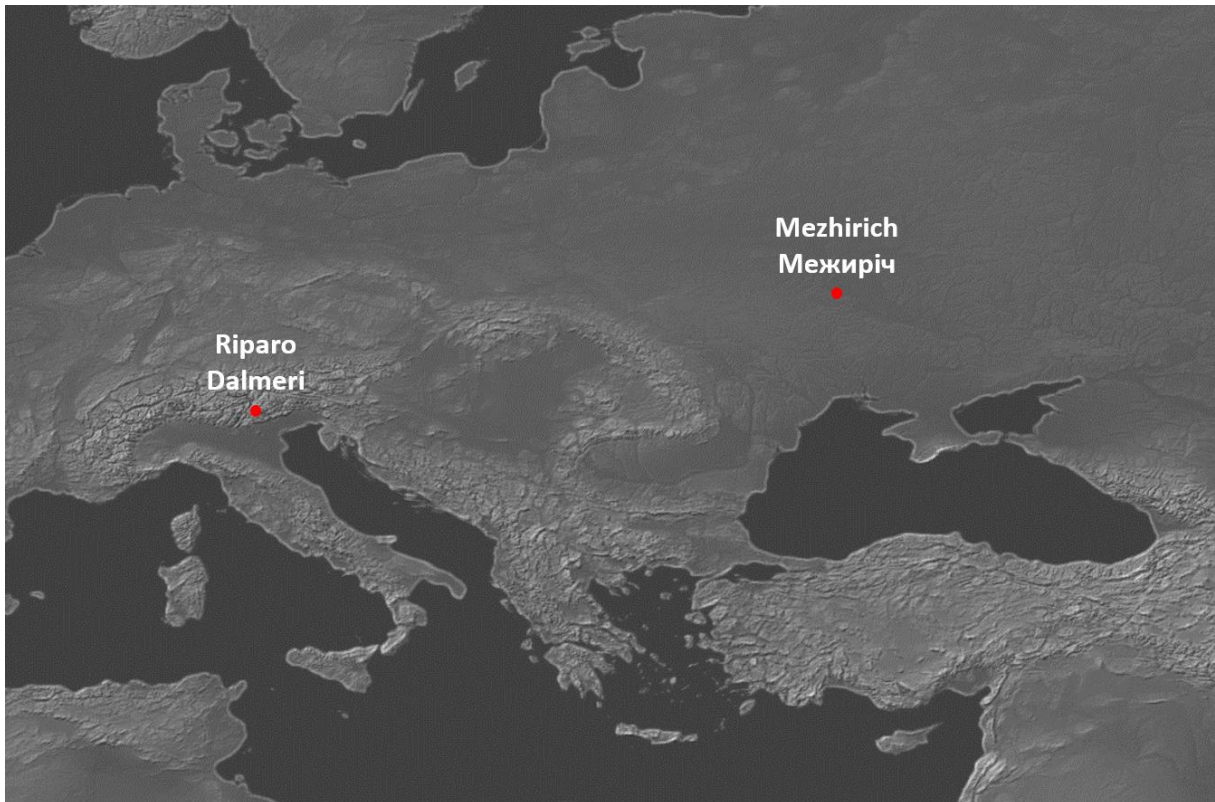


Figure 4: A drawing of the engraved mammoth tusk of Mezhirich (Kiev Museum) compared to a painted stone found in Villabruna (stone 2, Aimar, A. Et al. 1992). Below, patterns in the drainage area of the Khmil'na field compared to the stone RD 082 found in Riparo Dalmeri, (Dalmeri et al. 2011) and stone 2 of Villabruna.



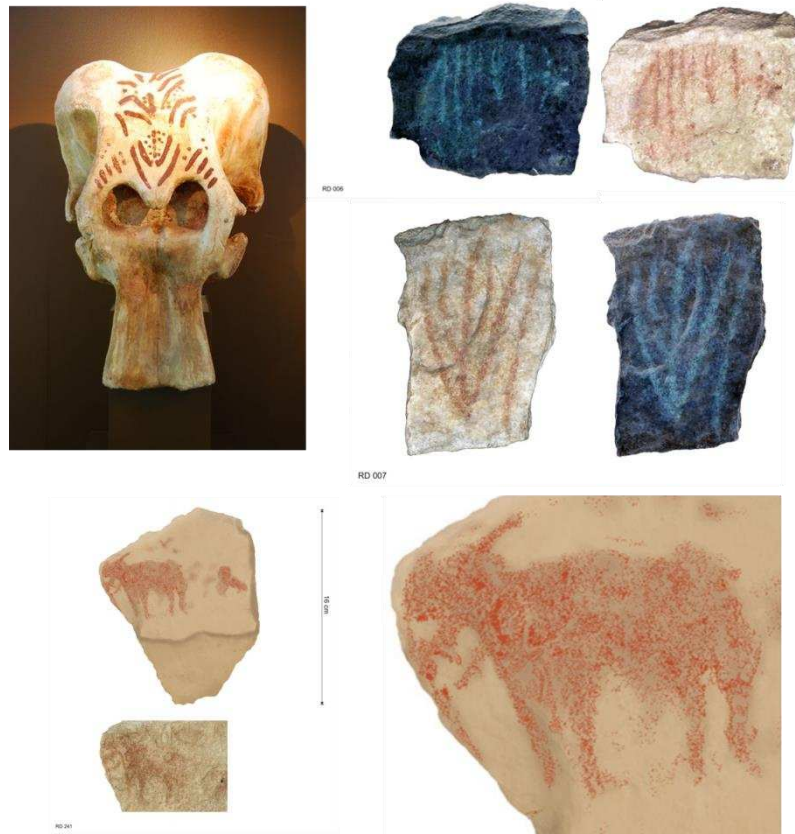


Figure 5: Paintings on the mammoth skull found in Mezhirich dwelling-1 (reproduction, Angouleme Museum) compared to painted stones found in Dalmeri RD 006/ RD 007 ((Dalmeri et al. 2011). Below, a reconstitution of the painted stone RD241 found in Dalmeri (Dalmeri et al. 2011) considered here as representing an *elephantidae*.

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