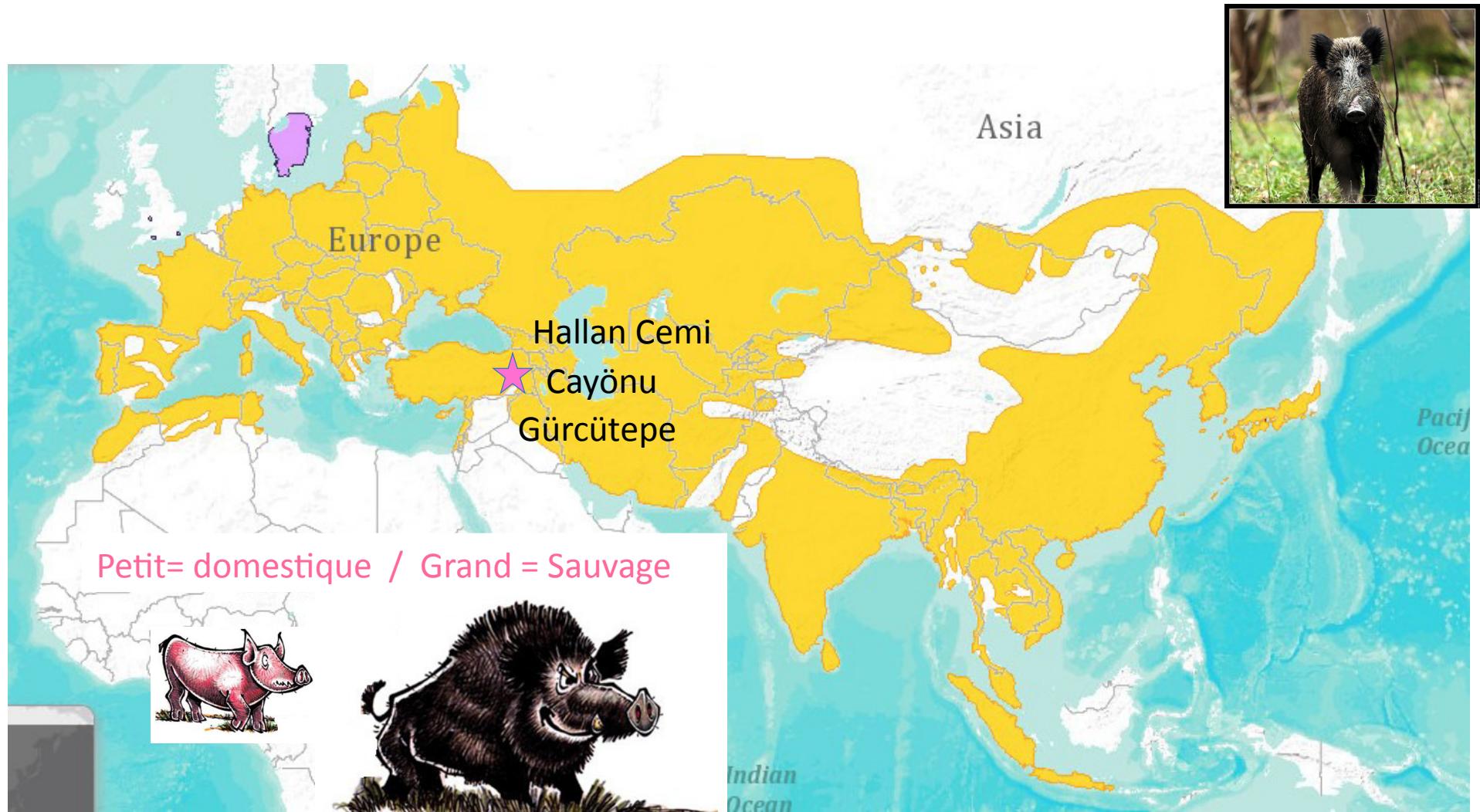


# Analyses isotopiques de restes archéologiques: Etude des relations hommes-animaux



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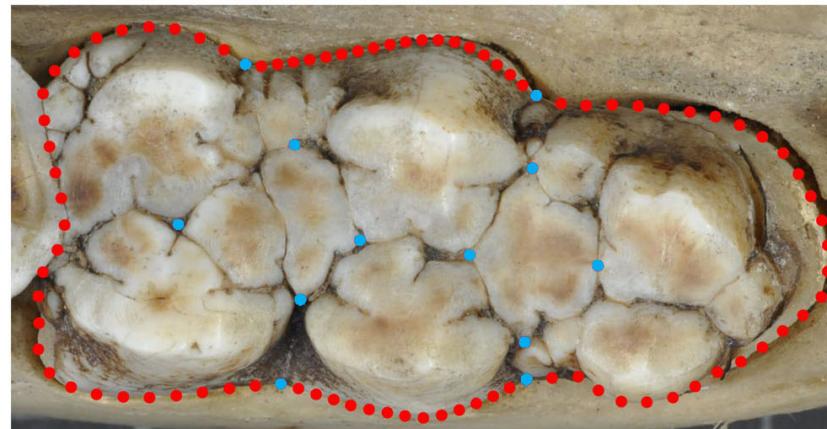
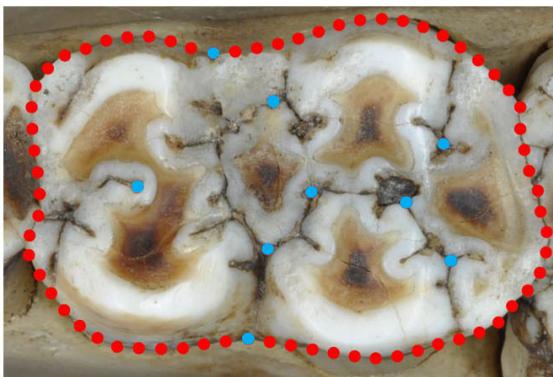
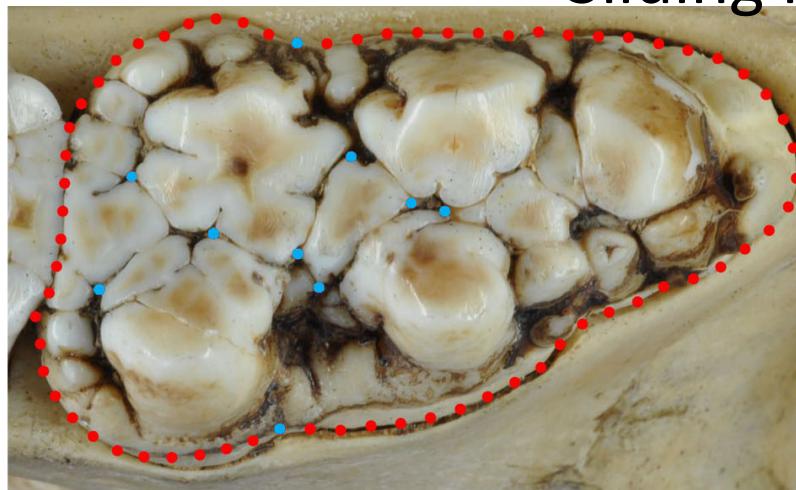
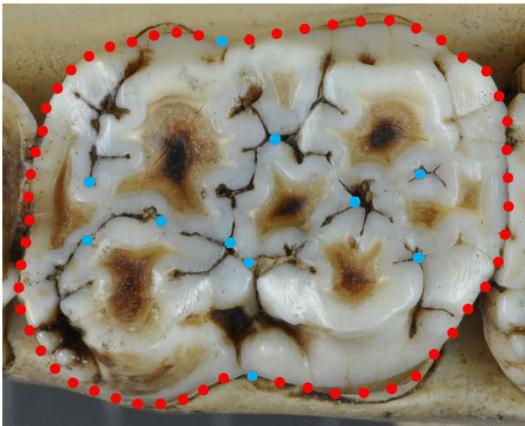




Biométrie (diminution de taille) + Courbes d'abattage

# Morphométrie géométrique

Landmarks   
Sliding landmarks 



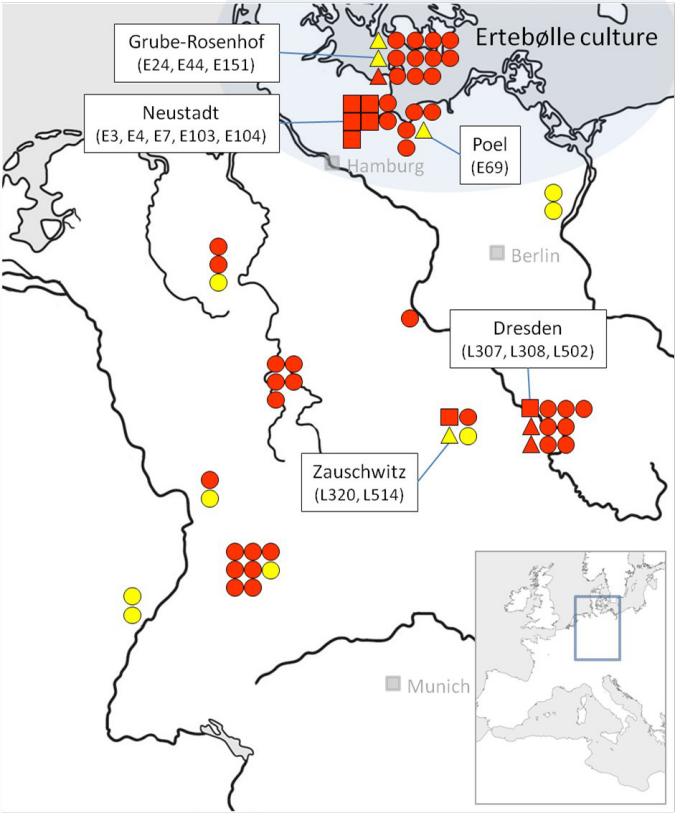
-Taille

-Conformations

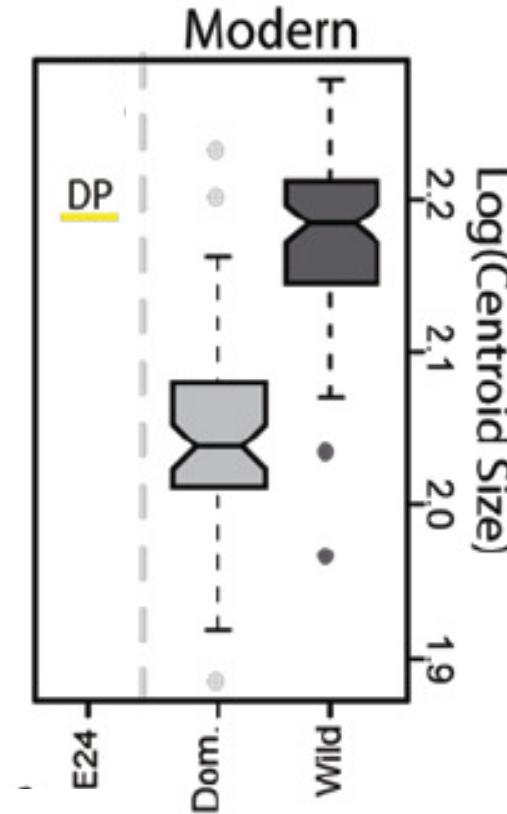
-Allometries (relation taille/conformations)

-Variance

+ ADN ancien



Krause-Kyora et al., 2013 Nature Communication



- ❖ ~4750-4450 cal BC
- ❖ mtDNA → introduit du PO
- ❖ MC1R → haplotype domestique
- ❖ Conformation molaire  
→ plus proche des domestiques
- ❖ Taille molaire → grande!

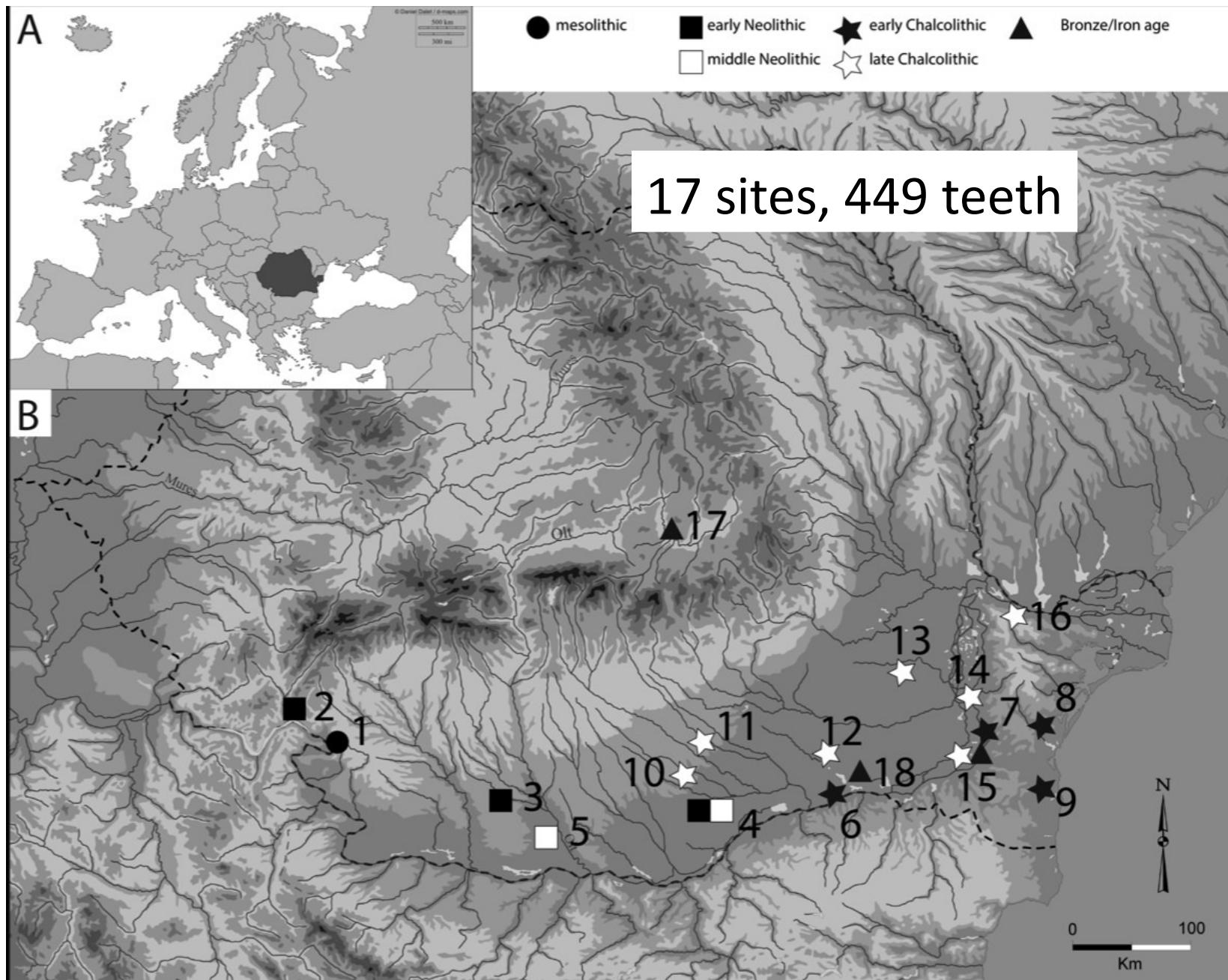
Preuves de spécimens avec des caractéristiques domestiques obtenues (au moins partiellement) de leurs parents....

Status?

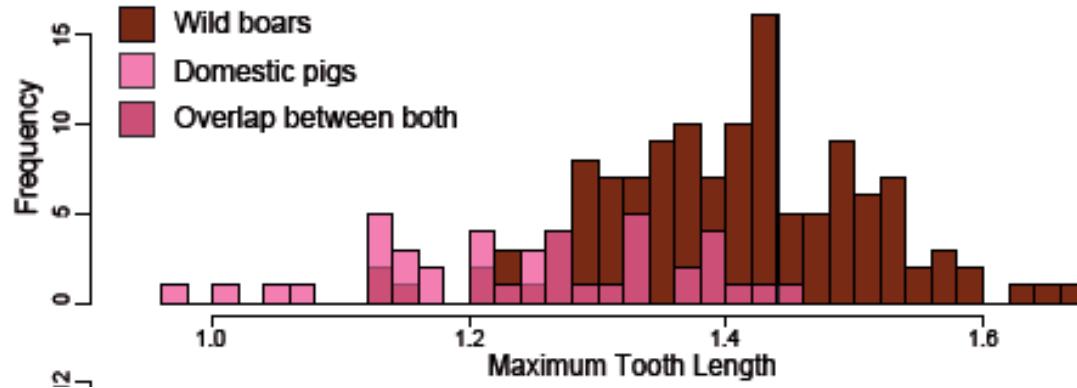
- Domestique?
- Sanglier?
- Hybride?

- Captif?
- Vivant dans le milieu naturel?

- Chasse?
- Echange?

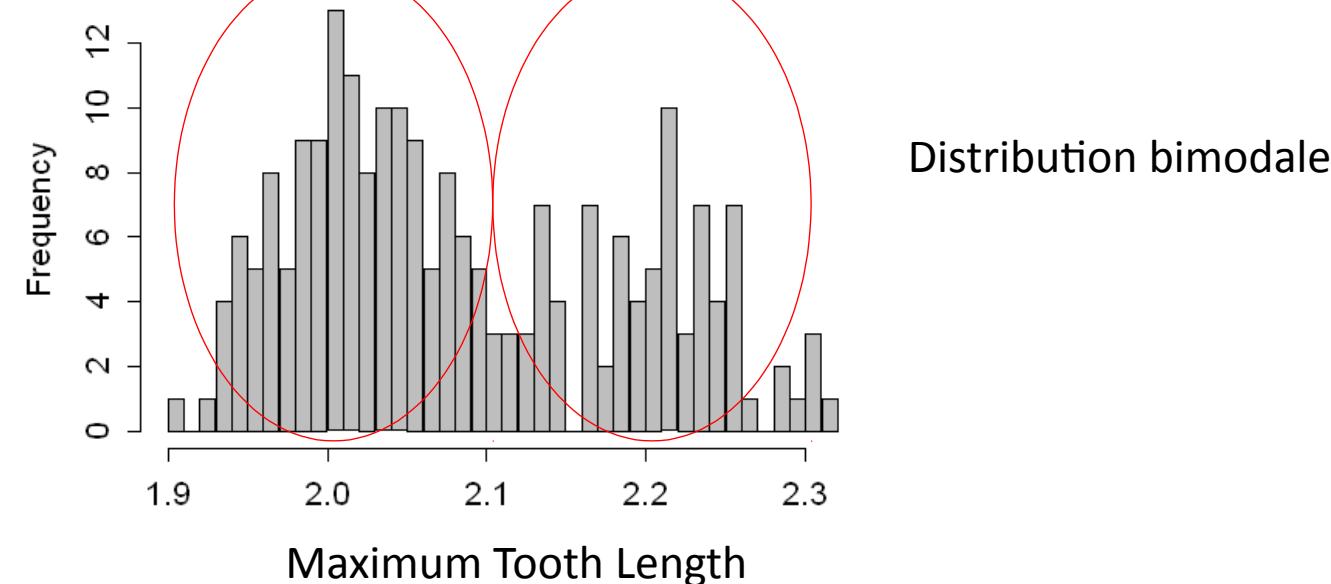


Modernes

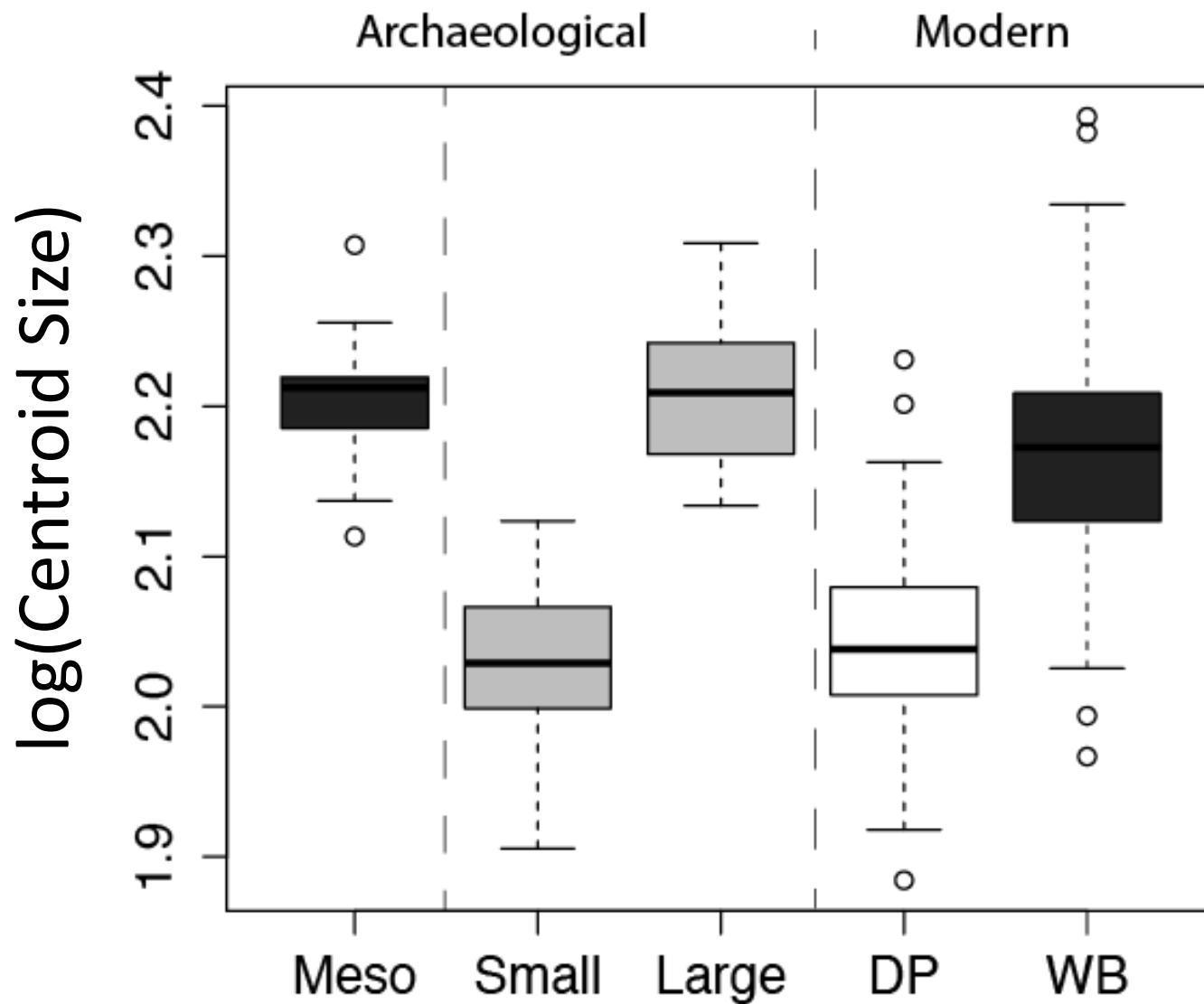


Absence de groupes clairs de taille

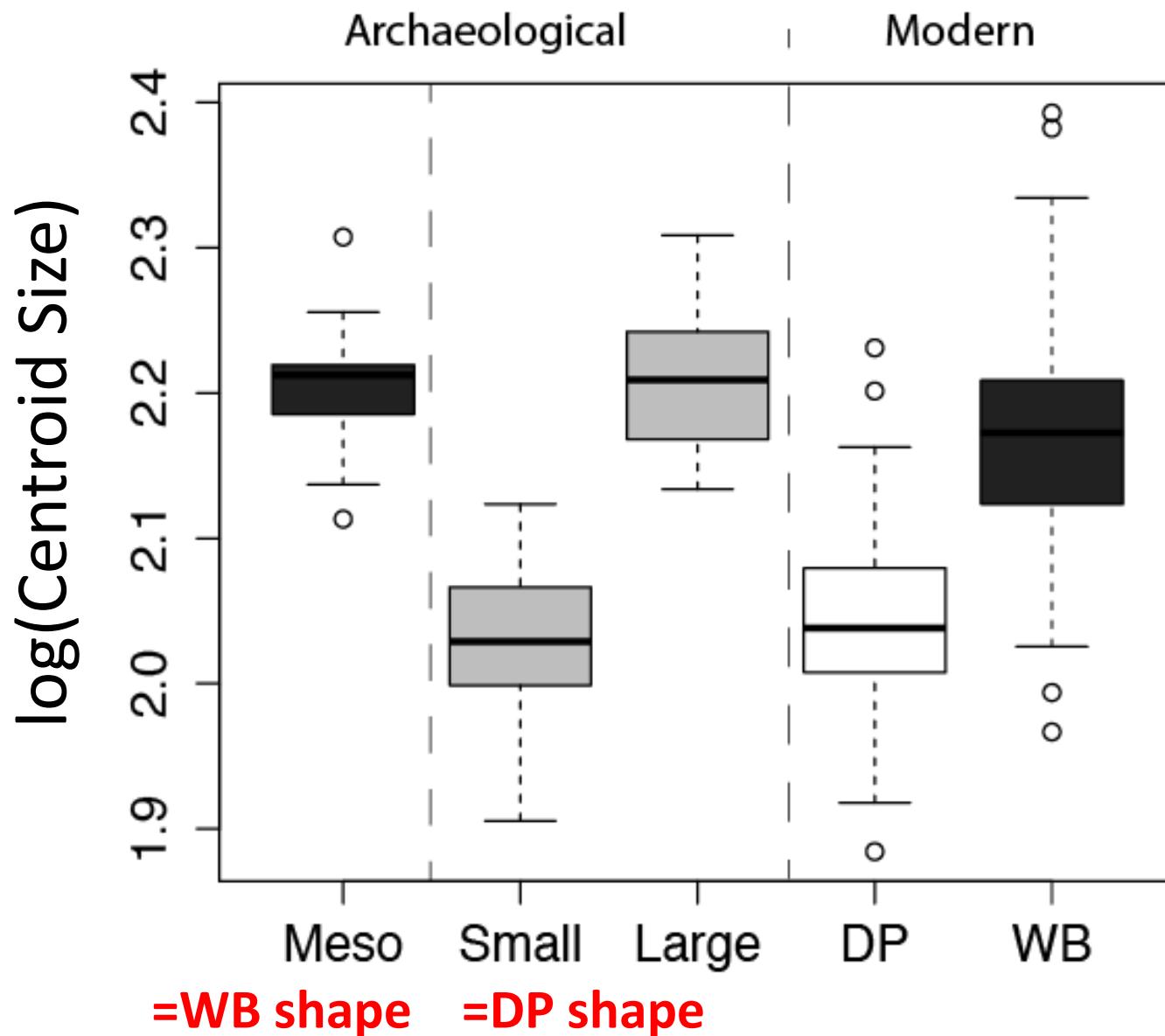
Archéologiques



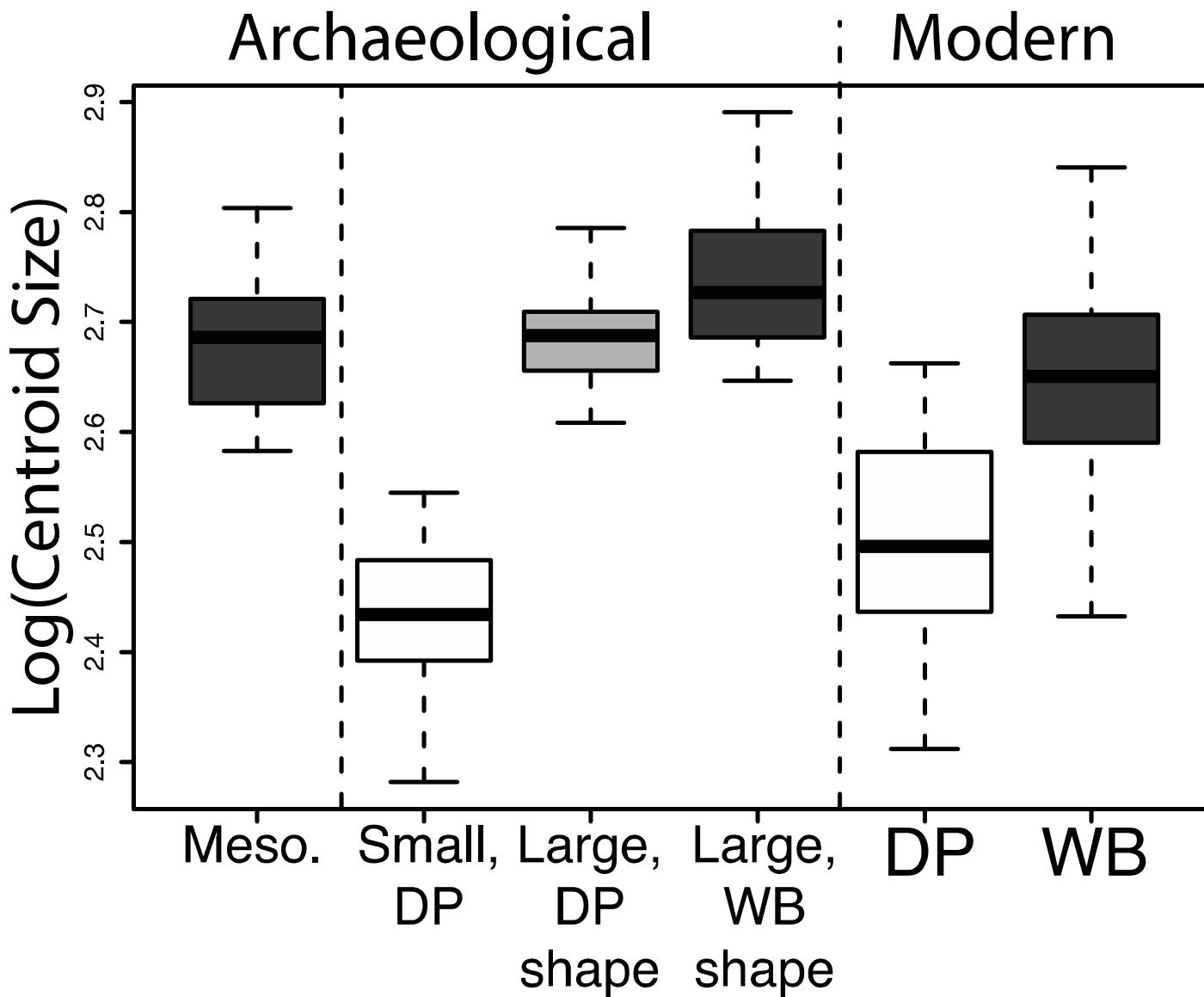
# Mise en place d'un nouvel outil d'identification

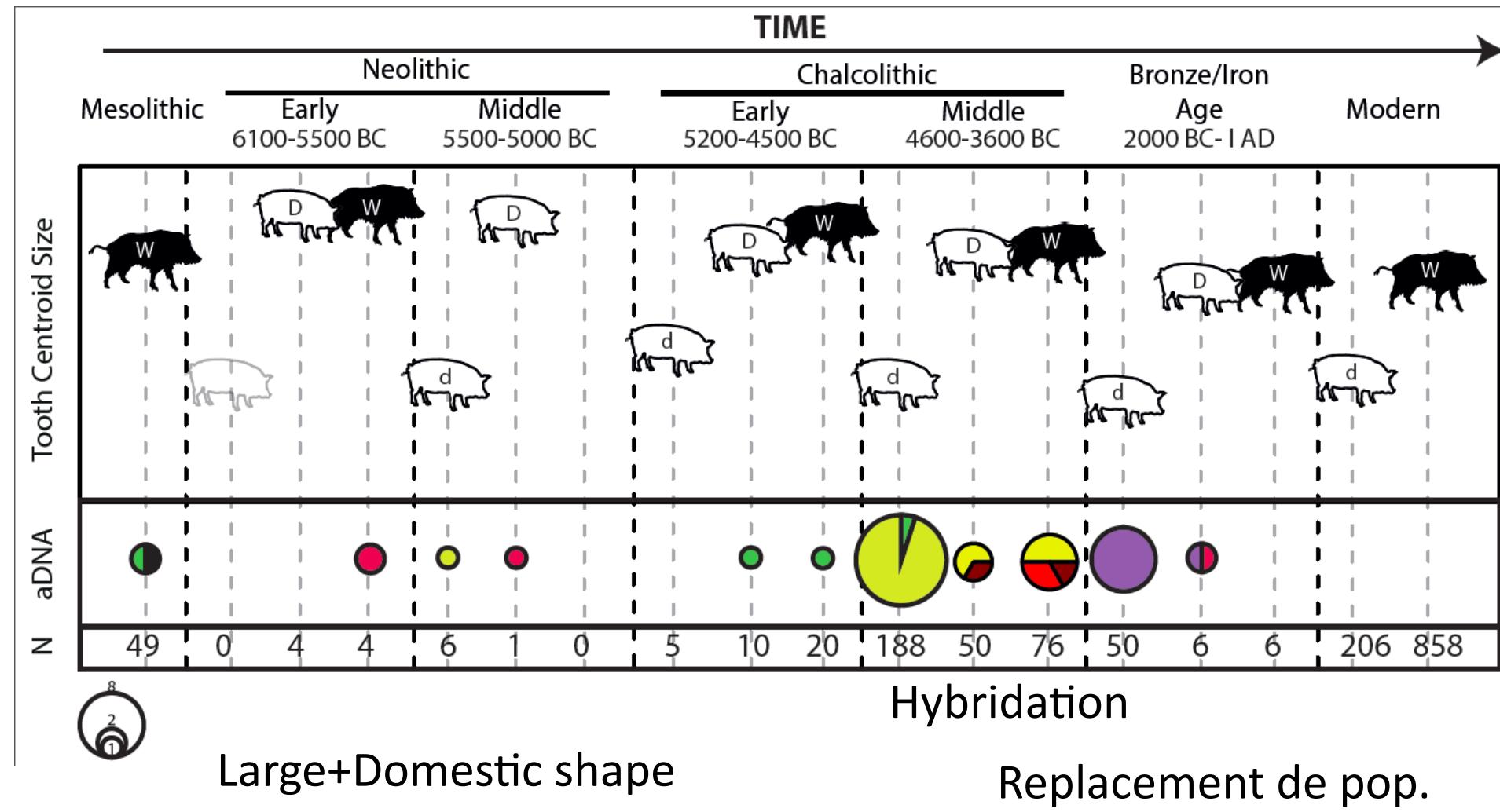


# Mise en place d'un nouvel outil d'identification



# Mise en place d'un nouvel outil d'identification

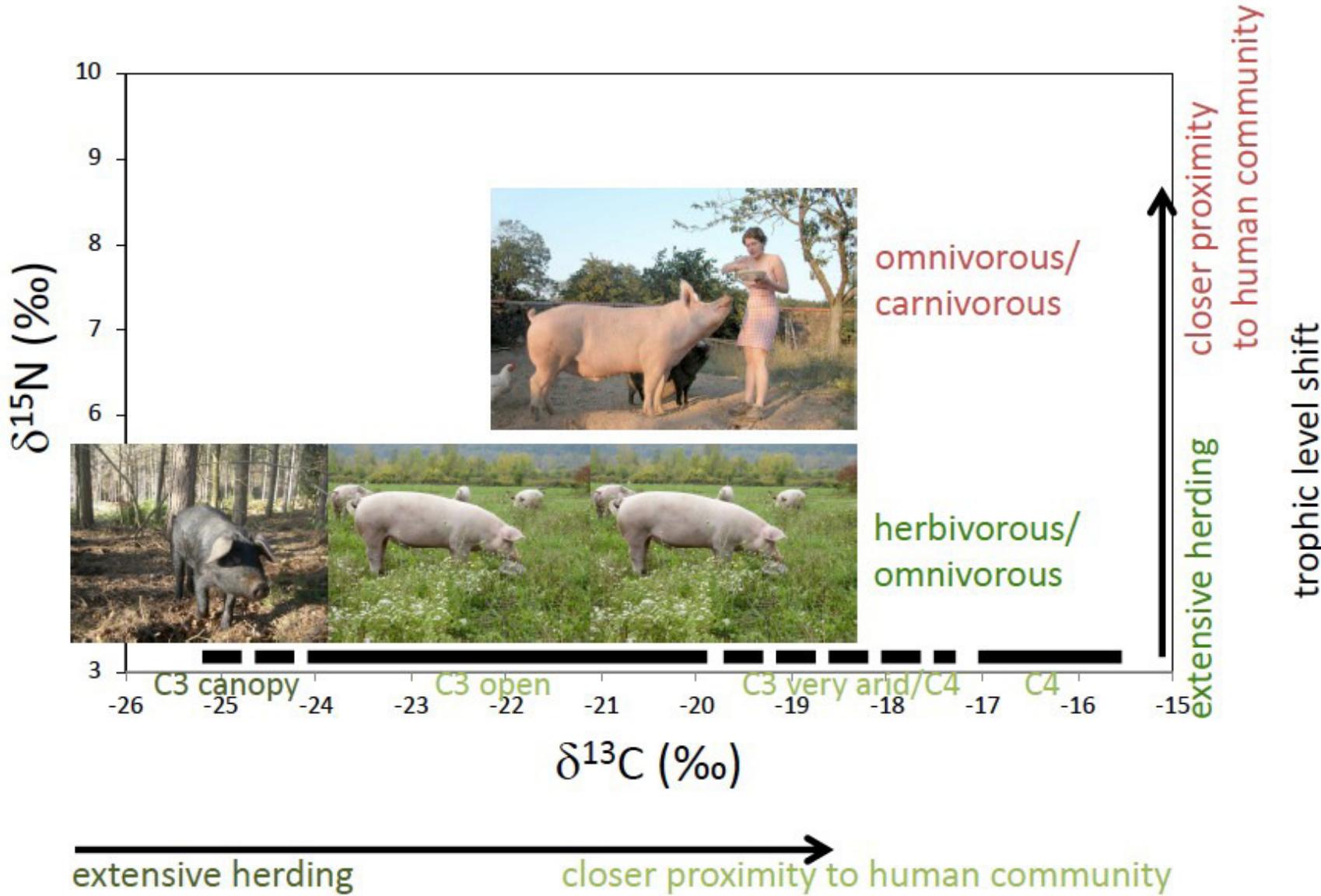






# Marie Balasse, CNRS-MNHN

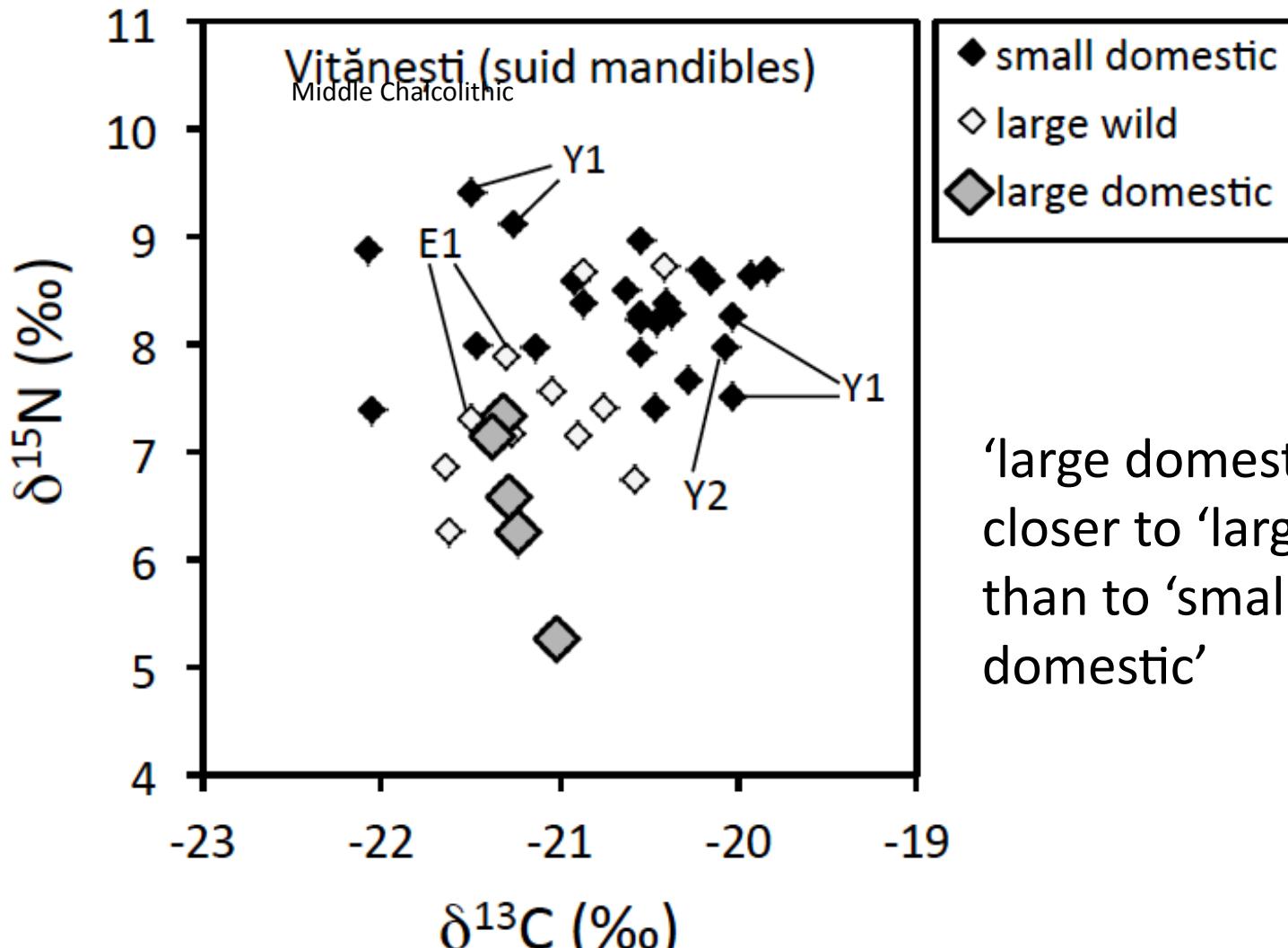
## Service de Spectrométrie de Masse Isotopique MNHN



# Proximité à l'homme

$\delta^{13}\text{C}$  Diet (C3/C4 plants)

$\delta^{15}\text{N}$  Trophic level (herbivorous/omnivorous/carnivorous)



'large domestic' are  
closer to 'large wild'  
than to 'small  
domestic'

Preuves de spécimens avec des caractéristiques domestiques obtenues (au moins partiellement) de leurs parents....

Status?

- Domestique? + élevage extensif?

- Sanglier? 

- Hybride? (féral)

- Captif?

- Vivant dans le milieu naturel?

- Chasse?

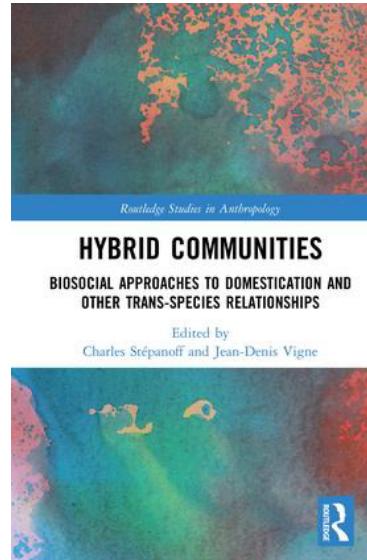
- Echange?

## RESEARCH ARTICLE

## Social Complexification and Pig (*Sus scrofa*) Husbandry in Ancient China: A Combined Geometric Morphometric and Isotopic Approach

Thomas Cucchi<sup>1,2\*</sup>, Lingling Dai<sup>3,4</sup>, Marie Balasse<sup>1</sup>, Chunqing Zhao<sup>5</sup>, Jiangtao Gao<sup>5</sup>, Yaowu Hu<sup>3</sup>, Jing Yuan<sup>5</sup>, Jean-Denis Vigne<sup>1</sup>

→ Confrontation des changements morphologiques aux changements de pratiques agraires en Chine



Balasse M, Cucchi T, Evin A, et al (2018) Wild game or farm animal? Tracking human-pig relationship in ancient times through stable isotope analysis. In: Hybrid Communities Biosocial Approaches to Domestication and Other Trans-species Relationships, 1st Edition. pp 81–96

→ Synthèse des articles sur les isotopes du cochon

# Saisonnalité, sevrage, alimentation du bétail, etc....

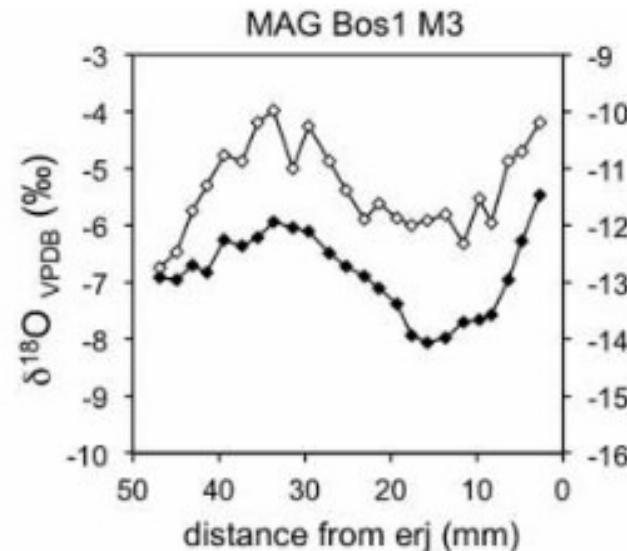
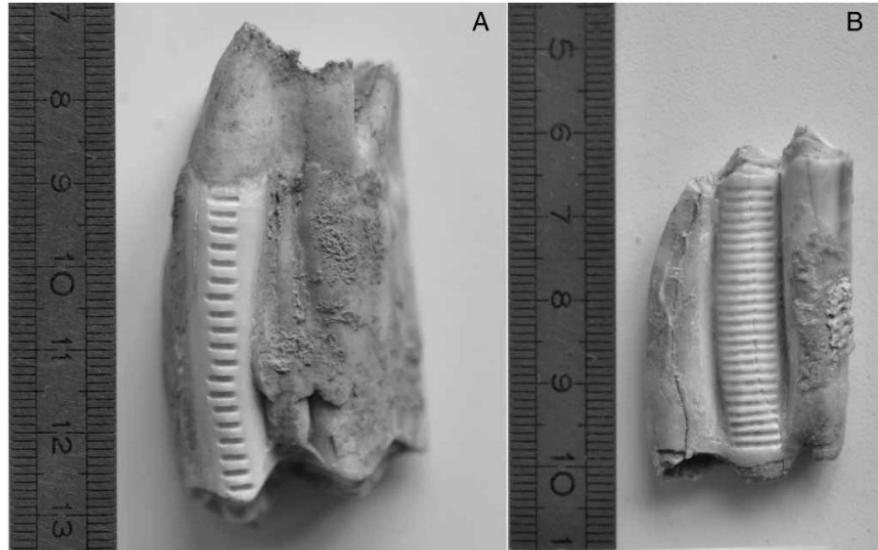


Figure 2. Procedure of enamel sampling in cattle upper third molars (A – MAG Bos4 M3) and sheep (B – MAG Ovis2 M3) lower third molars at Măgura.

Balasse et al (2013) Early herding at Măgura-Boldul lui Moș Ivănuș (early sixth millennium, Romania): environments and seasonality from stable isotope analysis.  
*European Journal of Archaeology* 16:221–246.