Temporal and spatial variations of Reindeer (*R. tarandus*) body size during the Middle and Late Pleistocene in Western Europe

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Reindeer (Boselaphus tarandus) inhabited a vast part of Eurasia during the Middle and Late Pleistocene. They were often a common prey for prehistoric hunters, particularly for Magdalenian people (a period also known as "L’âge du renne" Larroque, 1981). We propose to consider three sites from the south of France and include them in Weinstock's model (2000).

Temporal variability
- Reindeers from Cauro de l’Argo are significantly larger (p<0.05 and p<0.01) than animals from other sites.
- OSI 3: body size decrease (Teinoual 8-C and Combe-Grenal 19-17). In the Late Paleolithic, body size remains small despite some significant fluctuations that may correlate with climatic oscillations.

Spatial variability
- In Asteriagnac layers, body size increase from south to north. Reindeers from southern Germany are larger than those from Ros de Combe 5 (p<0.05). Weinstock, 2000, which are larger than those from Tournel F (p<0.01).
- In Late Glacial levels, animals in full-wool are robust while they are smaller at lower latitudes (Pincevent or Kammerloch).

Environmental and ecological factors
- Snow depth and climatic variation affect body size and bear formation of seasons, e.g. NOC index (Kunz et al., 1999; Weisbòl et al., 2003).
- Temperature and humidity play a role in reindeer especially during growing season (Weinstock, 2000 and Dufour, 1987).
- Some other factors play a role like latitude e.g. temperature and productivity of climate (Chabrier et al., 2005; Weisbòl, 1995 and Weisbòl et al., 2003).

Ontogenetic factors
- Age and sex of individuals influence body size.
- Genetic variability of this character cannot be estimated in palaeontological records.
- Assessment of sexual dimorphism is also important. In this population species, proportion of sexes differs than those acting on 100%.

Conclusions
- Causes of body size change are multiple. In order to compare as well as possible variability, we have to integrate large samples and control sex-ratio and sexual dimorphism in each population.
- Phenotypic variation (Vp) is the result of heritability (Vh), phenotypic plasticity (Vp) and interaction between genotype and environment (Vpe).

Vp = Vh + Vp + Vpe

References