

## Oral presentation

### **Problematic pollen and solid seed evidence: archaeobotanical case study of *Cannabis* and *Humulus*.**

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**Introduction.** *Cannabis* and *Humulus* currently belong to the small family of Cannabaceae which only includes these two genera. The pollens of these genera are difficult to differentiate, and thus archaeobotanical research has variously reported evidence for *Cannabis sativa*, *Cannabis*, *Cannabis*-type, *Humulus lupulus*, *Humulus*, *Humulus-Cannabis*-type, or Cannabaceae. Identification of carbonized and non-carbonized seeds (achenes) individually for both *Cannabis* and *Humulus* is generally accepted and gives us a much firmer basis for recognizing ancient human-plant relationships among these genera and people over time.

**Objectives.** An improved and generally acknowledged technique to allow positive identification of *Cannabis* vis-a-vis *Humulus* would facilitate the paleoethnobotanical record of presence and possible uses of these genera that have ancient histories of human-plant relationships. In addition, an increase of archaeobotanical research, especially in regions beyond Europe would enhance our understanding of the ancient spread and various uses of hemp and hops.

**Methods.** An extensive review of the paleoethnobotanical and archaeobotanical literature, which has increased exponentially over the past 40 years, is used to reveal the problematic aspects of differentiating ancient, excavated *Cannabis* and *Humulus* pollen; the review also reviews the differential levels of certitude with which archaeobotanists have identified either or both *Cannabis* and *Humulus* in the ancient pollen records they have published.

**Results.** An overview of ancient pollen evidence reported for species in Cannabaceae reveals a varying degree of certainty with which paleoethnobotanist and archaeobotanists have identified *Cannabis* and/or *Humulus* in their microremains, and demonstrates the need for improved techniques to differentiate these subfossil remains to the genera level.

**Conclusion.** This paper reviews and analyzes the ancient broad distribution of *Cannabis* and *Humulus* in terms of published evidence for pollen and seeds, and makes recommendations for future archaeobotanical field and laboratory research.

Keywords: Paleoethnobotany, Cannabaceae, Microremains, Macroremains, Verification

#### Selected References

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