Renewed paleontological investigations in the Olțeț River Valley of Romania and the new paleontological locality of Râpa

Claire E. Terhune1, Sabrina Curran2, Alexandru Petculescu3, Chris A. Robinson4, Marius Robu5, Emil Stiuca3
1Dept of Community and Family Medicine, Duke University School of Medicine, Durham NC; 2Cleveland Museum of Natural History, Cleveland OH; 4Dept of Geospeleology and Paleontology, "Emil Racovita" Institute of Speleology, Bucharest, Romania; 5Dept of Biology, Bronx Community College, City University of New York, Bronx NY

ABSTRACT

Present evidence suggests that neither current intrinsic nor extrinsic hypotheses can fully explain the initial hominin dispersal out of Africa in the early Pleistocene, although paleoenvironmental data suggest this dispersal may have been facilitated by climatic changes. Though the earliest hominins outside of Africa appear at Dmanisi, Georgia at ~1.85 Ma, well dated European hominins have not been recovered before ~1.2 Ma (Sima del Elefante, Spain). Is this a true absence, perhaps due to ecological restrictions, or have hominins not yet been found in earlier European deposits?

In seeking to address these questions, we review existing data for early Pleistocene Romania and report the results of an initial survey of the Olțeț River Valley of Romania. This valley is the location of the richly fossiliferous early Pleistocene site of Grăunceanu. Fossils recovered at this site include the fossil papionin Paradichthippus arvernensis, which has been reconstructed as highly terrestrial and may have inhabited a niche similar to that of Astrapotherium. Mode 1 stone tools have also been reported from this area, though their validity is questionable. Interpretation of both paleontological and archaeological remains from this region is hindered by lost records and poor dating. Our preliminary surveys identified a new site (Râpa) containing in situ fossils, including a partial mammoth skull. These remains, in addition to the development of new stratigraphic profiles, allow us to document the context of fossil deposition in this valley through which we will assess whether hominin dispersal through this region during the early Pleistocene would have been possible.

HOMININ DISPERAL OUT OF AFRICA

• Theories for how and why hominins initially dispersed out of Africa typically fall into two categories:
  - Intrinsic hypotheses suggest hominin dispersal was facilitated by:
    - New tool technologies
    - Increased meat consumption
    - Increased body size
    - Human-like intermembral index
    - Flexible behavior
  - Extrinsic hypotheses suggest hominin dispersal was related to:
    - Normal mammalian dispersal
    - Functions following predators
    - Hominins following prey species
    - Demographic pressure
    - Environmental pressure

• Many of these intrinsic and extrinsic hypotheses are unsupported by evidence from Dmanisi (e.g., Tappen 2009).
• At present, the best evidence is that climate fluctuations were a major influence on hominin dispersals out of Africa. Paleoclimatological studies demonstrate substantial changes during the early Pleistocene (e.g., Vrba 1995; Behrensmeyer et al. 1997) with an expansion of more open, aridland biomes into Eurasia (e.g., Cerling 1991; deMenocal & Bloemendal 1995; Dennell & Roebroeks 2005).
• One outstanding possible intrinsic hypothesis that is not refuted by data from Dmanisi is that hominin dispersals were facilitated by increased behavioral flexibility (Potts 2012), which would have allowed hominins to exploit many types of habitats.

ARCHAEOLOGICAL REMAINS

No hominin remains have been identified from the early Pleistocene of Romania, but researchers in the 1960s reported finding Mode 1 stone tools in the Olțeț Valley. A poor excavation record and doubts regarding the anthropogenic origin of these materials make the existence of a Lower Paleolithic record in Romania questionable.

THE OLȚEȚ RIVER VALLEY

An especially promising paleontological research area in Eastern Europe is situated in the Olțeț River Valley of Romania. Exploration in the 1960s identified multiple fossiliferous localities, several of which remain some of the most fossiliferous sites from this time period in Eastern Europe.

HOMININ DISPERAL INTO EUROPE

• The earliest well-dated European hominin site (Sima del Elefante, Spain) is over 600 thousand years younger than Dmanisi (Carbonell et al. 2008).
• Were there geographic or environmental barriers that prevented or delayed hominin dispersal into Western Europe during the early Pleistocene?
• One suggestion is that particular European carnivore species outcompeted hominins for resources (Turner 1992, 1999).
• Another possibility is that there were some ecologies to which hominins were unable to adapt (e.g., because of the lack of specific prey species or plant food items).

RÂPA

• In situ fossil remains of a turtle and juvenile mammoth
• Mammal specimens included a partial pelvis, femur, and multiple vertebrae; many elements are still in articulation
• Preliminary stratigraphic analysis suggests an alluvial/dealina sequence similar to that described for Grăunceanu

RECENT INVESTIGATIONS

• The original excavations at Grăunceanu were halted when no fossils remained, and testing conducted in 2004 by a joint Romanian/American team recovered no specimens (McNulty pers. comm).
• As many as 15 smaller localities in the region have also yielded fossils. Unfortunately, the locations of many of these sites are currently unknown.
• We undertook a preliminary survey of the region in March 2012 and successfully relocated two known localities - Grăunceanu and La Pietris - and identified a previously unknown site (Râpa) that yielded in situ fossils.

FUTURE WORK

Additional data describing the paleoclimatological conditions in early Pleistocene Eastern Europe are necessary to fully evaluate the validity of these hypotheses. In particular, well-documented datasets from Eastern Europe, which likely served as a dispersal corridor into and out of Europe during the early Pleistocene, are critical. Only by further documenting paleoecological similarities or differences (e.g., habitat availability, carnivore guild composition, prey species) between sites in Eastern Europe and known hominin localities can we provide direct support for or against the hypothesis that these factors were important for preventing hominin dispersal into Europe.

ACKNOWLEDGEMENTS

• Kieran McNulty
• Josiah Charles Trent Foundation, Duke University
• Department of Anthropology, University of California, Santa Barbara

LITERATURE CITED


DSpace@NYU: http://www.lib.nyu.edu/services/dspace