

DATE LIST

Radiocarbon dates from the Iapodes collection at the Archaeological Museum in Zagreb, Croatia

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Abstract

This date list reports the unpublished results from a multi-year radiocarbon dating program of the prehistoric Iapodes collection at the Archaeological Museum in Zagreb. Dated materials were excavated from cave, burial, and settlement contexts by various museum teams during the past century.

Introduction

Lika is a geographic region circumscribed by multiple mountain ranges, including the Dinaric Alps and Velebit Mountains, which also divide the landscape into a series of small and large valleys (Figure 1). The largest of these valleys are Gacka and Lika, each named after the rivers that flow through them. Though archaeological excavations have occurred in Lika since the late nineteenth century, the early prehistory of the region is still poorly understood. Evidence for settlement and other human activity is sparse until the Late Bronze Age (ca. 1200–800 BC), when large-scale sociopolitical and economic reorganization is suggested by the rapid proliferation of hillforts on the landscape and shifts in burial practices from individual stone mounds to large communal cemeteries (Drechsler-Bižić 1987). These changes are traditionally assumed to coincide with the arrival in Lika of the Urnfield culture from eastern Pannonia and the development of a unified regional culture: the Iapodes, the name given to Lika's inhabitants by classical writers.

The traditional Iapodian cultural chronology was first proposed by Drechsler-Bižić (1983a, 1983b, 1987) and is based on the stylistic and typological evolution of certain grave goods. Phase 1 begins at the start of the Late Bronze Age (1200 BC), when novel grave-good types first appear in burials at Bezdanjača cave. In phase 2, material differences between Lika and its neighbors become more pronounced in the form and decoration of grave-goods. The following phases (3–7) are divided according to perceived changes in these initial types, the development of unique ornamentation, and increased frequency of amber and glass objects in burials. The Iapodian cultural sequence ends with the Roman conquest of Lika ca. 35 BC and the subsequent incorporation of the region into the larger administrative province of Illyricum.

Radiocarbon dating of previously excavated Iapodian sites was undertaken as part of the author's doctoral dissertation examining regional trends towards sociopolitical complexity and group identity in Lika at the end of the Bronze Age (Zavodny 2017). All dated materials are from the Iapodian collections curated by the Prehistoric Department at the Archaeological Museum in Zagreb and come from cave, settlement, and burial contexts excavated by various museum teams during the twentieth century (Figure 1; S1). Many of these assemblages have not yet been fully studied or published; therefore,

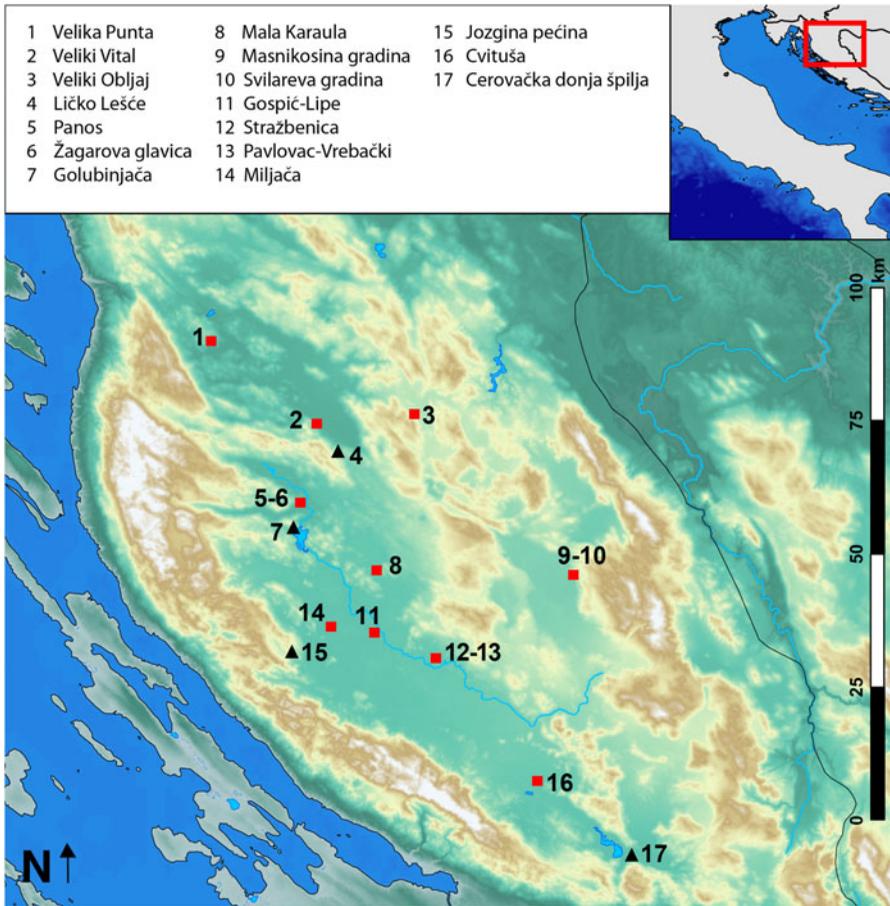


Figure 1. Map of Lika showing sites dated in this program. Triangles denote cave sites.

sampling for radiocarbon dating prioritized material classified by excavators as likely Late Bronze or Early Iron Age based on context and associated finds.

The dates reported here have either never been published or only partially published as calibrated date ranges using the outdated IntCal14 calibration curve (Zavodny and Bakarić 2017; Zavodny et al. 2017; Zavodny 2020). The objective of this paper is to fully report all radiocarbon dates and associated data so that they can be reused by future researchers (Millard 2014).

Methods

Samples were prepared following standard procedures for bulk bone collagen extraction and purification at The Pennsylvania State University Human Palaeoecology and Isotope Geochemistry Laboratory between 2014–2017. Briefly, up to ~500 mg of dry compact bone were taken from each archaeological sample and crushed to increase the area of reactive surface before being washed in NanoPure water and demineralized in 0.5N HCl at 5°C. The demineralization process varied from several days to several weeks depending upon the sample. Samples were then prepared for collagen extraction and purification using a modified Longin (1971) method with ultrafiltration (Brown et al. 1988) as outlined elsewhere (McClure et al. 2010; Zavodny et al. 2019). Poorly preserved collagen samples were processed using a modified Stafford method (Stafford et al. 1988, 1991) for XAD-purification (Lohse et al. 2014) to remove humic and fulvic acids. Before dating, samples were analyzed

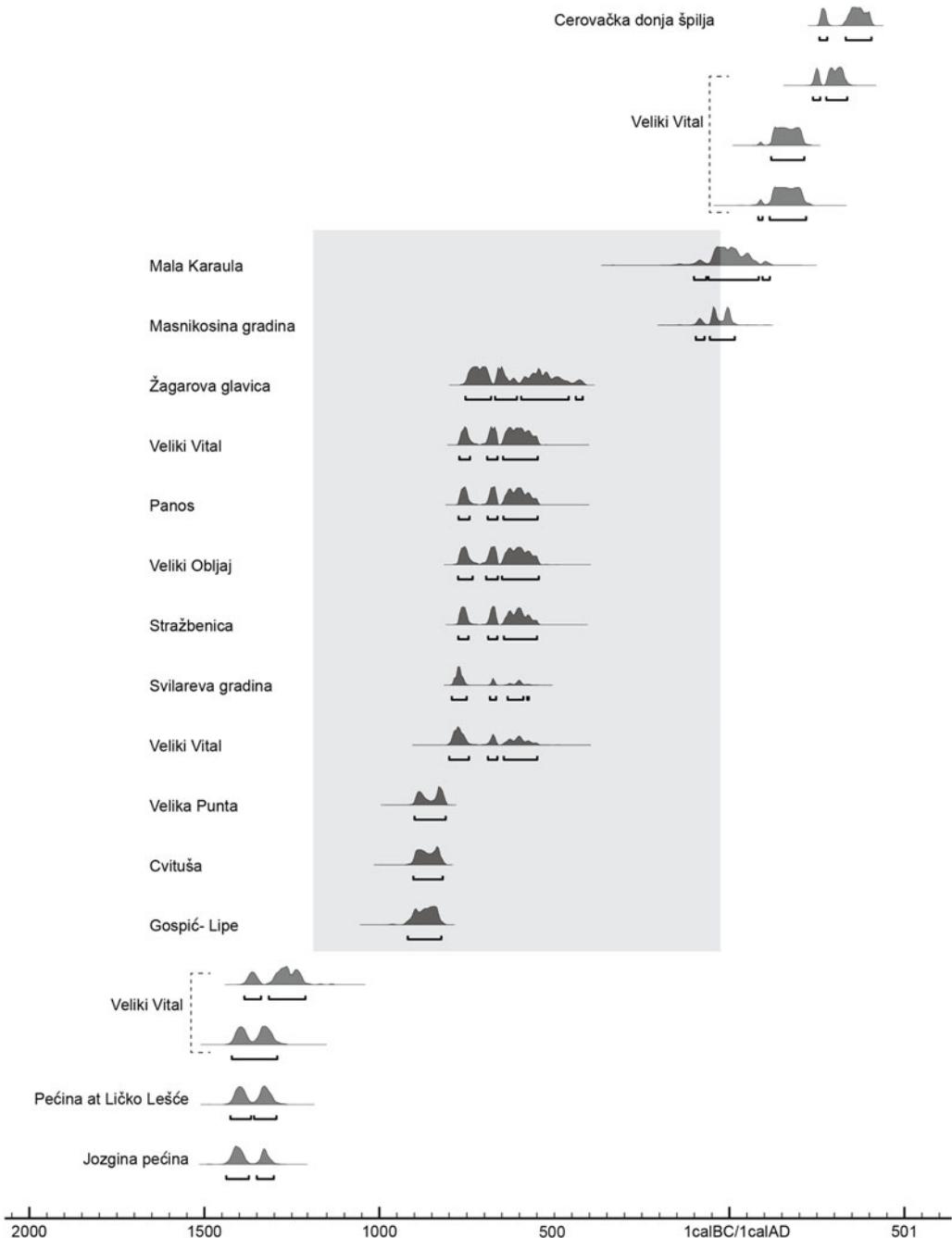


Figure 2. Calibrated AMS radiocarbon dates with period corresponding to the Iapodian cultural chronology (ca. 1200–35 BC) shaded in gray. Extreme outliers from Golubinjača, Jozgina pećina, and Pavlovac-Vrebački are not shown on this figure.

at the Yale Analytical and Stable Isotope Center (YASIC) for %C, %N, and C:N to determine preservation (DeNiro 1985; van Klinken 1999).

Once good preservation was established, radiocarbon samples (~2.5 mg) were combusted for three hours at 900°C in vacuum-sealed quartz tubes with CuO and Ag wire then sent to either the

Keck Carbon Cycle AMS facility at UC Irvine (UCIAMS) or the AMS Radiocarbon Laboratory at The Pennsylvania State University (PSUAMS) for graphitization and measurement. Results were corrected for isotopic fractionation according to Stuiver and Polach (1977) and calibrated using Oxcal v.4.4 and IntCal20 (Bronk Ramsey 2009, 2020; Reimer et al. 2020). Conventional radiocarbon ages and errors are listed in Table 1. Calibrated and modeled date ranges are reported at the 2 σ level and rounded by five years. All data and quality controls can be found in the supplementary material (S1).

Results and discussion

The results of 25 radiocarbon measurements representing 17 sites are summarized in Figure 2. As expected, the majority of sites date to the Late Bronze and Iron Age portion of the Iapodian cultural chronology (Figure 2), despite some interference from the Hallstatt Plateau. Two hillfort sites also straddle the “end” of Iapodian prehistory and the beginning of the Roman (Antique) period.

Though sampling focused on presumably late prehistoric archaeological contexts, there were radiocarbon dates that dated either much earlier or much later. These outliers occurred almost exclusively at cave sites—Cerovačka donja špilja, Golubinjača, Jozgina pećina, and Ličko-Lešće—that were likely used sporadically over thousands of years (Drechsler-Bižić 1984). The long-term reuse of some sites almost certainly resulted in mixed stratigraphy that make some of these associations unreliable. For instance, dates from both early prehistoric and modern era periods come from the same contexts at Golubinjača (3790–3650 cal BC *and* cal AD 1640–1800) and Jozgina pećina (1440–1300 cal BC *and* cal AD 1665–1880 (72.9% probability)).

Outliers were also present at the hillfort site of Veliki Vital (Figure 2). Radiocarbon dates from this study confirm findings from prior archaeological excavation and analyses that pointed to sustained occupation during the Iron Age and into the Roman period, when the site became known as *Arupium* (Drechsler-Bižić 1975a). However, at least one house radiocarbon dates to the Middle Bronze Age (ca. 1600–1200 BC), much earlier than suggested by artifact analyses alone and before the official “start” of the Iapodian culture (Zavodny and Bakarić 2017).

This tension between absolute radiocarbon dates and relative chronological assignments in Iapodian archaeology has been explored elsewhere (Zavodny 2020; Zavodny et al. 2019), but the date from Pavlovac-Vrebački in this study is also highly illustrative of the problem. Pavlovac-Vrebački is a group of six tumuli, four of which were excavated in 1980. Only Tumulus I held human remains—a double burial of a male and female—and fragments of coarse gray pottery (Drechsler-Bižić 1983b, 243). Despite the lack of datable finds, Pavlovac-Vrebački has been consistently assigned to the Middle Bronze Age because of similarities in its mound construction with the Middle Bronze Age tumuli at Lički Osik (Drechsler-Bižić 1975b). As part of this study, the cranium of one individual from Pavlovac-Vrebački was dated. The resulting date (cal AD 770–975), however, is Early Medieval—almost two thousand years younger than expected.

Conclusions

This study significantly expands the number of radiocarbon dates reported for the region of Lika. While many of these dates confirm the traditional narrative of Iapodian cultural development, others demonstrate how little we know about the regional (pre)history outside of this comparatively small period of time. With these findings in mind, the author advocates for current and future researchers to continue to (1) revisit past assemblages with new scientific techniques; (2) publicize unpublished or rarely mentioned assemblages; and (3) identify new directions or research questions that will test inherited knowledge about legacy collections.

Supplementary material. To view supplementary material for this article, please visit <https://doi.org/10.1017/RDC.2024.122>

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