

# Radiocarbon dating of burial and seed samples from the Sokol fortress in Konavle near Dubrovnik, Croatia



Ines Krajcar Bronić<sup>1\*</sup>, N. Topić<sup>2</sup>, N. Drašković Vlašić<sup>3</sup>, Ž. Peković<sup>2</sup>, J. Barešić<sup>1</sup>, A. Sironić<sup>1</sup>, D. Borković<sup>1</sup>

<sup>1</sup>Ruđer Bošković Institute, Bijenička 54, 10000 Zagreb, Croatia, [krajcar@irb.hr](mailto:krajcar@irb.hr)

<sup>2</sup>Omega Engineering d.o.o., Riječka 16a, 20000 Dubrovnik, Croatia

<sup>3</sup>Omega Engineering d.o.o., Ilica 145, 10000 Zagreb, Croatia



Position of Croatia, city of Dubrovnik and the Sokol fortress, in Konavle near Dubrovnik



The Sokol fortress was built on a huge natural rock formation



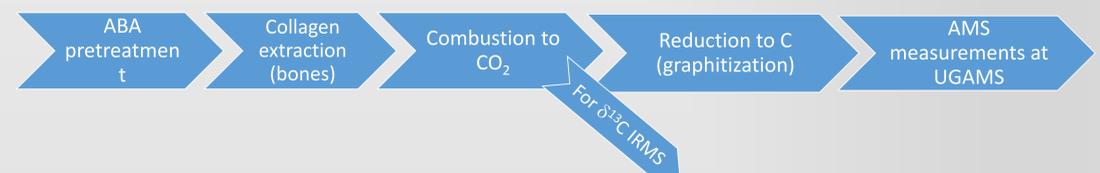
## History

The area around the fortress Sokol in Konavle near Dubrovnik, Croatia, was inhabited as early as the prehistoric period. The fortress was very important in Roman times, and it was also a significant control point on Justinian's limes (Byzantine Empire, 6th cent.), having a transitional role from the Balkan hinterland to the Adriatic Sea. In the medieval period, the fort was under several patrons, which frequently changed. In the late Middle Ages, it came under the rule of the Dubrovnik Republic, which held the fort until 1672, when it was abandoned.

**Radiocarbon AMS dating** of 27 human bone samples and 2 almond seed samples:

Sample pretreatment and graphitization: R. Bošković Institute

AMS measurement: Radiocarbon Facility at the University of Georgia (UGAMS), Atlanta, GA, USA



**Archaeological excavations** carried out in 2012 and 2013 revealed various phases of the site with many burials around the fortress; unfortunately, the burial sites did not contain goods apart from one burial with a coin that cannot be evaluated due to corrosion. The tombs are primarily constructed of stones and bricks (*tegulae*) and rarely without grave construction. According to stratigraphy and other finds around burials, only the approximate dating was possible, so a comprehensive radiocarbon dating was performed.



Grave 12, Tr.2, #7  
Z-5617: 1531 ± 23 BP  
6th century

Grave 18, Tr. 2, #16  
Z-5620: 1171 ± 23 BP  
9th century

Grave 7, Tr. 2, #18  
Z-5085: 1100 ± 29 BP  
10th century

Grave 39, Tr. 2, #27  
Z-5633: 648 ± 22 BP  
14th century

Results expressed as conventional radiocarbon ages : BP - Before Present, 0 BP = 1950 AD, <sup>13</sup>C-normalized Calibration of conventional <sup>14</sup>C ages to cal AD/BC: OxCal4.2 software and IntCal13 calibration curve

## Results

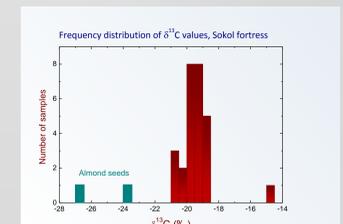
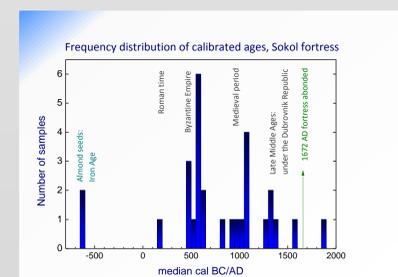
27 human bones revealed that the burials can be dated from early Roman to late Modern times:

12 bone samples - between 1580 ± 25 BP and 1430 ± 25 BP (calibrated age spans fall to 5th and 6th century AD)

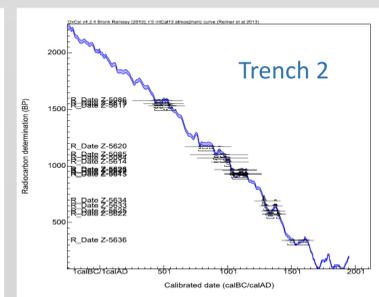
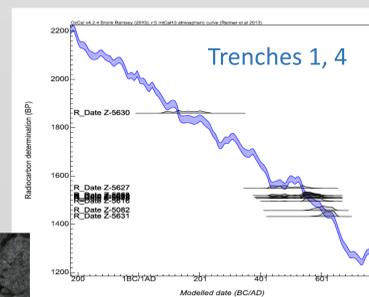
8 samples revealed calibrated age spans from 8th to 11th century

4 samples were dated to 14th century,

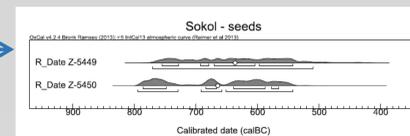
individual samples: 1860 ± 24 BP (90 – 213 cal AD), 342 ± 20 BP (16th century) and 68 ± 21 BP (19th century).



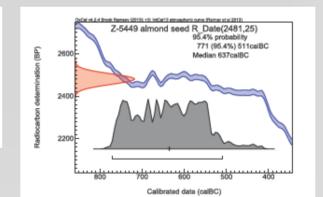
The d13C of bone collagen ranged from -18.7 ‰ to -20.8 ‰ VPDB – typical values for bone collagen.



Beside the burials, seeds of carbonized almond were also found in the prehistoric mixed layer that was formed after a large earthquake at the end of prehistoric period. The seeds were probably stored in a house. Two samples were dated to the Iron Age:  
2480 ± 25 BP (756-543 cal BC) and 2520 ± 25 BP (787-567 cal BC).



Large span of calibrated ages is due to the flatness of the calibration curve for period 750 – 400 cal BC.



Photograph from: N. Kapetanić, Sokol grad u Konavlima. self publishing, Dubrovnik, 2013



## Conclusion

Although the site is of a military character, not only men but also many women and children were buried there. This demonstrates that there was a settlement around the fort that is often called the town of Sokol in archival data. The huge time span of the burials also bears witness to the continuity of the residential area around the fort.