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Age assessment of monumental olive trees from the Ionian islands, Western Greece, using three different individual dating approaches G. S. Polymeris (1), A. Martinis (2), Ch. Minotou (2), K. Poirazidis (2), A. Skiadaressis (2), Y. Maniatis (1)

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INTRODUCTION

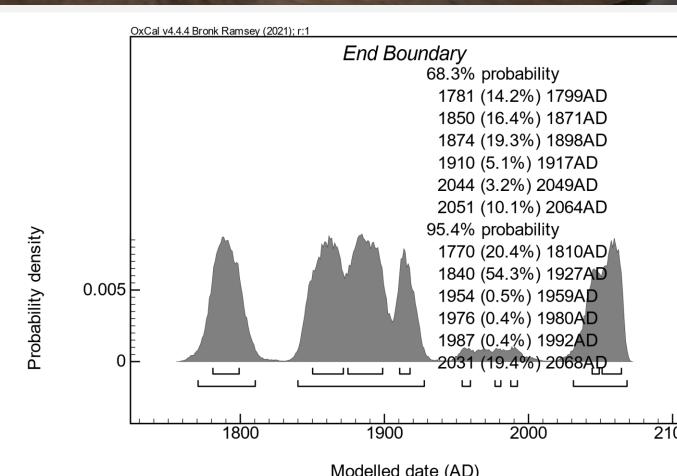
The present study focuses on several monumental olive trees that were recorded and mapped by the Ionian University, located at the Ionian islands (Corfu, Paxoi, Cephalonia, Ithaca, Lefkada and Zakynthos), in the Western part of Greece. Their corresponding perimeters at human breast height, ranges between 6.9 m and ~15 m. Towards an effort to preserve these monumental olive trees, dating was attempted using the following three approaches: (a) calculation of the radial growth rate from the existing, healthy wood pieces and calculating the number of rings (thus the age) that correspond to the radius of each tree according to the respective perimeter; (b) radiocarbon dating for selected pieces of wood from the trunks and (c) both optically and infrared stimulated luminescence (OSL and IRSL) dating of the sediments either surrounding or beneath the roots of the trees.

AL GROWTH RATE CALCULATION EXAM

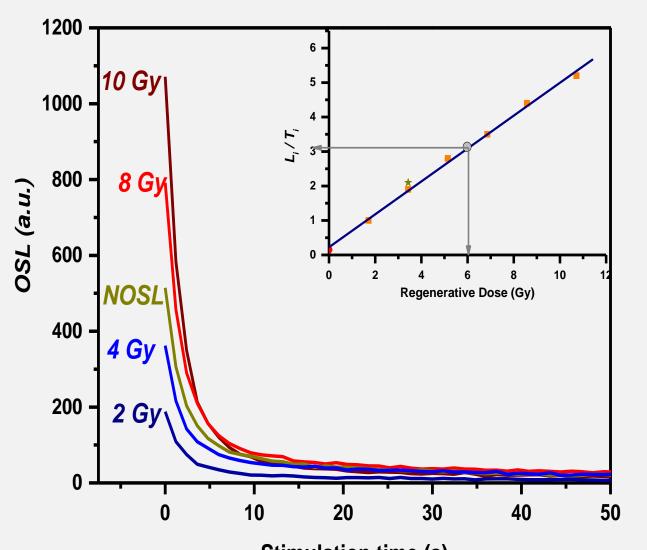


Calculation of the radial growth rate was performed using the number of rings that were counted over distances on healthy pieces of wood from each tree, assuming that this rate was stable all over the trees' lives. An average value of 0.8 – 1.2 mm/year was calculated. Ages were the ratios of radius over the radial growth rate/

BADIOCARBON	RESULTS							
RDIKI, CORFU	Island	Location	Perimeter/	Radial	OSLAge	IRSLAge	¹⁴ CAge	
			Radius (m)	Growth Age	(years BCE)	(years BCE)	(years BCE)	
	Zakynthos	Ampelos	14.20/ 2.261	(years BCE) 2213±129	1944±108	1885±96	< 373	
ernal rings sampled	Zakynthos	Ampelos (marked)	-	-	1610±180	1529±156	-	
	Zakynthos	Ag. Pantes	11.70/ 1.863	1573±77	1371±134	1265±77	< 68	Elia Korithi Deigma Elia
OxCal v4.4.4 Bronk Ramsey (2021); r:1 End Boundary 68.3% probability	Zakynthos	Akrotiti	9.30/1.481	1362±34	1291±66	1159±142	< 382	Deigma Ag Nikolaos Prodromos
1781 (14.2%) 1799AD 1850 (16.4%) 1871AD 1874 (19.3%) 1898AD 1910 (5.1%) 1917AD 2044 (3.2%) 2049AD	Zakynthos	Apelati	10.50/ 1.672	1516±44	_	_	-	EXI Akrolin Deiu ma Agoi Panitis, eratoria Pa E-pau akiaDeigma PL AL2 AL2
2051 (10.1%) 2064AD 95.4% probability 1770 (20.4%) 1810AD 1840 (54.3%) 1927AD 1954 (0.5%) 1959AD	Zakynthos	Elia	10.70/ 1.704	1629±159	_	_	- /	Deigna Top Seeen Point 12 Apelati
0 1976 (0.4%) 1980AD 1987 (0.4%) 1992AD 2031 (19.4%) 2068AD UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU	Zakynthos	Ag. Prodromos	7.50/1.194	1019±38	_	_	- /	
1800 1900 2000 2100 Modelled date (AD)	Zakynthos	Planos	7.90/ 1.258	1097±55	_	_	- /	
rnal rings were sampled as the est preserved ones from the	Lefkada	Athani	7.20/1.146	1241±66	613±102	685±45		LE10 Deigma LE10 LE64 LE15
viving part of the wood for ocarbon dating (upper photo). As	Lefkada	Vassiliki	7.20/1.146	1233±25	715±128	642±105		- Elia Odyssea
er wood decomposes fast, the served part represents younger es of tree growth. Hence, the ages	Lefkada	Fryni	-	-	801±82	829±33		LE 36
are yielded by ¹⁴ C are much	Lefkada	Elia Odyssea	9.90/1.576	1779±45	1614±61	1320±172	- /	
ocarbon age was calculated to be nger than 374 years (lower plot).	Cephalonia	Minies	6.90/ 1.099	1073±53	507±25	522±15	-	
RSF & IBSF	Cephalonia	Elia Kouventas	7.40/1.178	1119±61	795±94	911±126	-	
200 - 10 Gy 5 - 4	Cephalonia	Ag. Andreas	-	-	392±45	431±33	- 、	Zola Fotavg
300 - 8 Gy	Cephalonia	Valeriana	-	-	550±81	554±42	_	Krania Argost K. 4 Ag. Andr Kef 1 Minies - Kef 2 Kouventa Kef 6 valerian
600 - 0 2 4 6 8 10 12 0 2 4 6 8 10 12 Regenerative Dose (Gy) 400 - 4 Gy 200 - 2 Gy	Cephalonia	Krania, Argostoli	11.85/ 1.887	1773±69	-	-		Data SIO, NOAA, U.S. Navy, NGA, GEBCO
	Corfu	Gardiki	11.85/ 1.887	1372±124	Pending	Pending	< 374	KE53
0 10 20 30 40 50 Stimulation time (s)	Corfu	Argyrades	13.60/ 2.166	2183±232	Pending	Pending		KE32 KE23
amples of OSL curves measured for age assessment of the soil beneath	Corfu	Prasoudi	8.40/ 1.338	1396±59	Pending	Pending	-	KE38
e routes of the olive trees using the SAR protocol. Inset presents the	Paxoi	Ludovic. Salvatore	10.30/ 1.640	1770±55	-	-	-	PA23" PA5
corresponding growth curve. The	References					Acknowlodgom		



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Exar the ag the r SA corresponding growth curve. The methodology of Sahiner et al. (2020) was adopted.

References

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Acknowledgement

The research has been accomplished under the frame of the Program "Biomemories" of the Ionian University and has been financed by ESPA.