Title	Oak tree phenology
General	
metadata	
Abstract	The leaf-out phenology of a proportion of tagged oak trees (<i>Quercus robur</i>) is annually monitored from March to June to register the date of six stages from bud burst to fully extended and hardened leaves.
Keywords	Leaf burst, oak, phenology
Is this part of a larger study?	Yes, these observations are part of the blue tits breading season study
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Funding	Imperial College London, Department of Life Science
Data set status	
and accessibility	
Status	Ongoing
Latest update	February 2024
Latest archive	February 2024
date	
Metadata status	October 2024
Accessibility	
Storage location	"Research group space: SilwoodLTE", Imperial College London, ICT department
and medium	
Usage rights	Open access
Geographic metadata	

Geographic description	The study site is Silwood Park Campus from Imperial College London, Buckhurst Road, Ascot, Berkshire SL5 7PY, United Kingdom. Silwood Park campus, with 70 ha, contains ancient woodlands and few-decades-old oak-dominated woodlands. Study oak trees have been set across the campus woodlands, which are classified as W10a, W10e and W16a using the National Vegetation Classification. Silwood Park experiences an average annual rainfall of 698mm with little seasonal pattern (1987-2022). Mean hourly temperature is 10°C with July max of 23 °C and January min of 1.4 °C (1987-2022).				
Bounding coordinates	General for Silwood Park. The specific location and detail information of trees can be found in file: trees.csv In 2020 part of the campus boundaries changed and this resulted in the loss of about 116 trees.				
Latitude	51.411				
Longitude	-0.647				
UK National grid					
Square	SU				
Easting	94196				
Northing	68866				
Temporal metadata					
Temporal	Oak leaf hursting has been obse	erved in a series of trees since 2007. Trees have been			
description	divided in those observed each year (Long term trees) or those observed every other year; in even (even trees) or odd years (odd trees). Trees enter the database to replace dead individuals in any category. Missing data: 2020				
Begin	2007				
End	Ongoing				
Taxonomic metadata					
Taxonomic	Table: NAMESP				
level: species	Species	Species code			
1	Quercus robur	quercus.robur			
	Quercus petraea	quercus.robui quercus.petraea			
	Quercus cerris	quercus.cerris			
	Unknown Quercus (not Q.	quereus.cerris			
	robur)	quercus.sp			
	Fagus sylvatica	fagus.sylvativa			
	Populus sp.	populus.sp			
	Unidentified conifer	conifer			
	Castanea sativa	castanea.sativa			
	Carpinus betulus	carpinus.betulus			
	Betula pendula	betula.pendula			
	Alnus sp.	alnus.sp			
	Aesculus hippocastanum aesculus.hippocastanum				
	Acer pseudoplatanus	acer.pseudoplatanus			
	neer pseudopididius	acer.pseudopiatanus			

	Inglans vacis		inglone rocio			
	Juglans regia		juglans.regia			
	Crataegus sp.		crataegus.sp			
	Salix alba Fraxinus excel	lai on	salix.alba fraxinus.excelsior			
	Tilia platyphyl	los x coraata	tilia.x.europaea			
	Ulmus sp.		ulmus.sp			
Methods	Taxus baccata		taxus.baccata			
metadata						
General	Extracted from:	Lopera Doblas	(2017) Field Season Pr	otocol -handbook.pdf		
experimental		1	()	r		
design	three categories even year oaks v marked at the be from the distance Trees are associ woodcrete nest phenology of bl experiment due 2022 there are 2 exclude great tit Every tree has a	re associated by distance to a named bird box. There is a network of ete nest boxes across the campus' woodlands used to study the breeding gy of blue tits. From 286 nest boxes in 2019, 32 were excluded from etent due to the sale of campus land. 1 was removed by damage of tree. In ere are 220 active nest boxes, 173 boxes have a small entrance (26 mm) that great tits and 47 have a larger entrance (32mm).				
		nber written in the tag attached to the tree. Tree tags need to be replaced				
Data collection	occasionally but TreeIDs do not change over time ection Monitoring involves visiting every individual oak frequently from every ot weekly. Visits start from March 20th onwards to look for signs of leaf deverand scoring them according to the scale below, until they reach stage 6					
	Figure: different stages of the leaves.					
	Score					
			e without signs of gree			
		~	ırst' when green is firs	t visible between		
		wn bud scales	1 11 1	1:		
		-	ne bud has elongated a	nd is green starting to		
		w the tip of new		ne tip of the bud but are		
			d together on the base	ie up or me oud out are		
	4 'Le	af extension' is	when individual bright owers) hang separately	_		
			pollen is shed by anthe			

	6 'Full leaf expansion" is when tanning is deposit on leaves, they become dark green and hard					
	Leaf bursting is not uniform across all branches of the tree. The score reflects the highest phenological state most of the leaves that can be assessed shown at the moment of collection.					
	Girth: There is information of the circumference of some trees. The table Girth.csv contains measures taken 2007-2015, or between 2016-2019 without specific dates.					
Quality control	Phenology observations have been done by different researchers over the years. A complete list can be found in file: observers.csv					
	Curation of data files and creation of metadata has been done by Catalina Estrada since January 2018. Please read README_DataBaseOaks.txt to see specific issues and decisions.					
Data table metadata						
Number of tables	3					
Tables	trees.csv phenology.csv girth.csv					

File name		trees.csv			
Description		Gives species and location information for trees in the oak phenology,			
		blue tit experiment and veteran trees			
Size		270KB			
Case sensitive		No			
Number or records		4024			
Number of attribute	es	8			
Orientation		Variables (attributes) included	as columns		
Data table structure	e and				
attribute description					
Attribute name	Defin	ition	Type	Attribute description	
TreeID		ue number given to each tree	Integer	Count	
		ved in this or other experiment		Min: 1, Max: 4055	
		wood Park campus. Primary			
	key				
species	_	es of trees as Table: NAMESP	String	Text	
	above			NA: unknown species	
northing		Britain, National Grid,	Floating	Geographic coordinate	
	northing (Ordnance Survey)		point	NA: not available	
C		Britain, National Grid,	Floating point	Geographic coordinate	
		easting (Ordnance Survey)		NA: not available	
latitude	Latitude: north-south position		Floating	Geographic coordinate decimal	
WGS		84	point	degrees	
			NA: not available		
longitude	Longitude: east-west position		Floating	Geographic coordinate decimal	
	WGS84		point	degrees	

			NA: no available
SPlocation	Silwood Park named woodland or field where tree is located	String	Text following Silwood Park Site Plan 6/12/08- As field boundaries are not quite clear this location
remarks	Any other relevant information about the tree	String	might not be always accurate Text oak1 to oak30 is a foreign key related to table oak_acorn_oaks.csv table from different long term experiment

File name		Phenology.csv				
Description		Gives information about the phenology codes for leave flushing through				
_ '		spring.				
Size		3.4MB				
Case sensitive		No				
Number or records		107514	107514			
Number of attribut	es	5				
Orientation		Variables (attributes) included	l as columns	i e		
Data table structure	e and					
attribute description	n					
Attribute name	Defin	ition	Type	Attribute description		
VisitID	Uniqu	ue number given to a visit to	Integer	Count		
		s phenology, primary key,		Min: 2826, Max: 112283		
		to visits.csv				
TreeID	_	ue number given to each tree,	Integer	Count		
	relate	ed to trees.csv		Min: 1, Max: 4019		
				NULL: TreeID not yet assigned		
Score	Number representation for the stage		String	Alphanumeric		
		f flushing of the tree in a		Numbers 0 to 6, sometimes along		
	given	visit.		with signals < and >		
				0 = no sign of green		
				1 = green just showing		
				2 = budburst i.e., when the bud is		
				elongated		
				3 = shaving brush leaves emerged		
				4 = leaves fully extended		
				5 = trees anthers shedding pollen		
				6 = leaves turned dark green and		
				waxy (tanninised)		
				Data from raw data files keep.		
				This included values such as >, <		
				score, and unknown scores or		
				errors e.g. \$, 8, 9, 10		
Date		of visit of tree for phenology		Date dd/mm/yyyy		
		sment (extracted from VisitID:				
	visits.	.csv table)				

remarks	Any other relevant information	String	Text from field collection notes
	about the tree or phenology		

File name		girth.csv			
Description		Gives the girth or circumference of monitored trees in Silwood Park			
Size		142KB			
Case sensitive		No			
Number or records		3504			
Number of attribute	es	7			
Orientation		Variables (attributes) included as columns			
Data table structure	e and				
attribute description					
Attribute name	Defin		Type	Attribute description	
TreeID	_	ne number given to each tree,	Integer	Count	
		d to table trees.cvs		Min: 1, Max: 3960	
TreeForm	Basic	architecture of tree	String	Text maiden: if tree stem is not divided at 1.3m height multistems: if tree stem is divided before 1.3 m height NA: information not available	
Girth_cm	Circumference of the stem(s) at 1.3 m height. If multiple stems circumference was added		Integer	To the closest cm Min: 8, Max: 601	
Stems	Number of stems measured and added in the girth value		Integer	Count Min: 1, Max: 4 NULL: Information not available	
HeightGirth_cm		eight where stem's nference was measured	Integer	To the closest cm Min: 20, Max: 130 < 130: if measured was done before the standard but there is not information of specific height base: if measured was done at the base of three but is not information of specific height NULL: information not available	
Estimated		her or not the girth of stem not be measured and was ated	Integer	Nominal 0: no estimated, measured 1: estimated	
Date		extracted from VistiID or of time where girth measures taken	String	Date dd/mm/yyyy Please see above: Data collection/girth	