

Oak breeding seedling orchards - provenance trial assessment and analysis programme

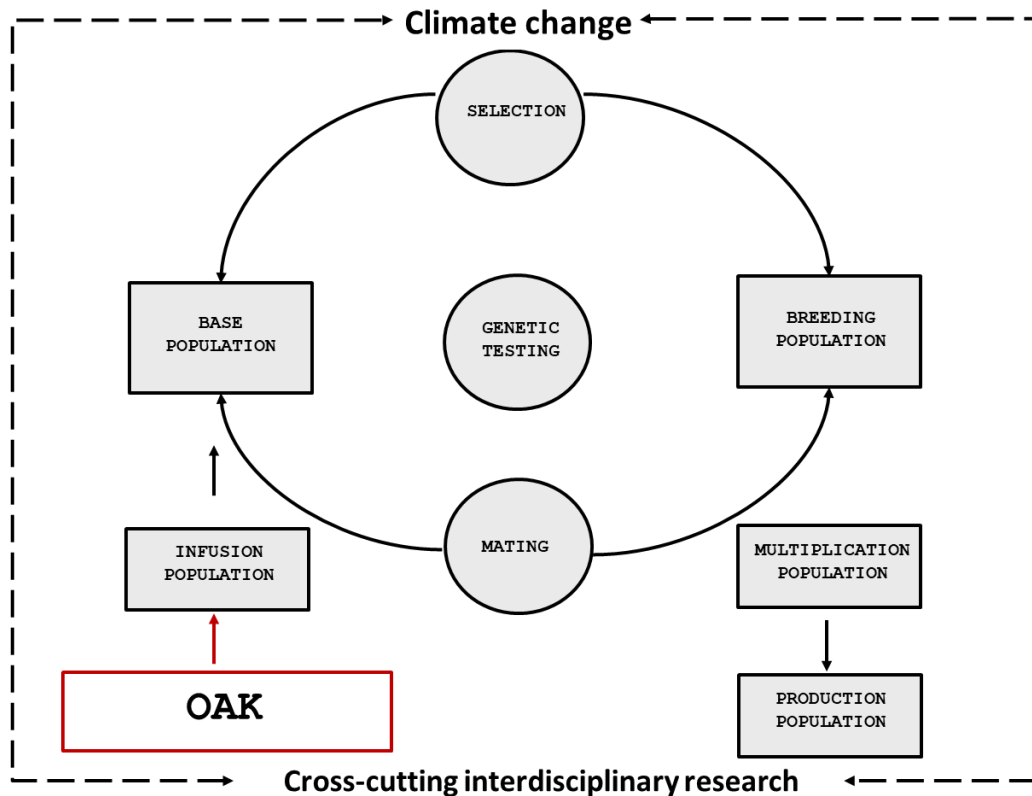
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27th June 2022



Oak tree breeding programme



Long breeding cycles
Market changes
Pests & diseases
Late flowering

Forest Ecology and Management 482 (2021) 118904



Contents lists available at ScienceDirect
Forest Ecology and Management
journal homepage: www.elsevier.com/locate/foreco



Oak provenances

Material

Four provenance trials were planted in 1988 to determine the best seed source of native oak for growers (*S. Kennedy., 2016; D. Felton et al., 2006*)

Site	County	Provenances	Plots
Belturbet	Monaghan	15	43
Camolin	Wexford	27	78
Donadea	Kildare	11	43
Durrow	Laois	19	57

The objective of this work is to determine the best provenances for planting out in Ireland and adaptability to environmental changes (bio-geoclimatic modelling) .



FITFOREST



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Oak provenances Assessment

A list of parameters/traits have been measured in 2021 and will be completed in 2022: Total Height, Timber Height, DBH, Form, Straightness, Apical dominance and Forking. Climatic data and soil characterisation

Trial layout and provenances (e.g. Camolin trial)

Letterkenny	01
Gort	02
Kenmare	03
Charleville Is.	04
Collooney	05
Rathdrum	06
Ballyvourney	07
Mulroy	08
Foxford	09
Lough Gill	10
Woodford	11
Knocktopher	12
Enniskerry	13
Cootehill	14
Corrakyle	15
Croagh Patrick	16
Killarney (Tomies)	17
Killarney (Derrycunihy)	18
Abbeyleix	19
Waterville	20
Glenealy	21
Shelton	22
Delgany	23
Glendalough	24
Glengariff	25
Charleville Main	26
Cahir	27

III	18	3	16	11	27	20			
	73	74	75	76	77	78			
	23	17	15	5	14	6	22	19	8
II	72	71	70	69	68	67	66	65	64
	12	9	7	2	1	4	21	13	10
	55	56	57	58	59	60	61	62	63
I	10	9	5	11	15	16	3	27	13
	54	53	52	51	50	49	48	47	46
	19	12	7	4	22	26	24	8	2
	37	38	39	40	41	42	43	44	45
	20	14	18	23	25	6	17	21	1
	36	35	34	33	32	31	30	29	28
	27	12	21	4	8	17	23	26	14
	19	20	21	22	23	24	25	26	27
	19	5	13	25	16	24	2	9	11
	18	17	16	15	14	13	12	11	10
	22	18	7	3	1	20	6	10	15
	1	2	3	4	5	6	7	8	9



Oak breeding seedling orchards

Material

Site details of eight breeding seedling orchards (BSO's) in the UK and Ireland.

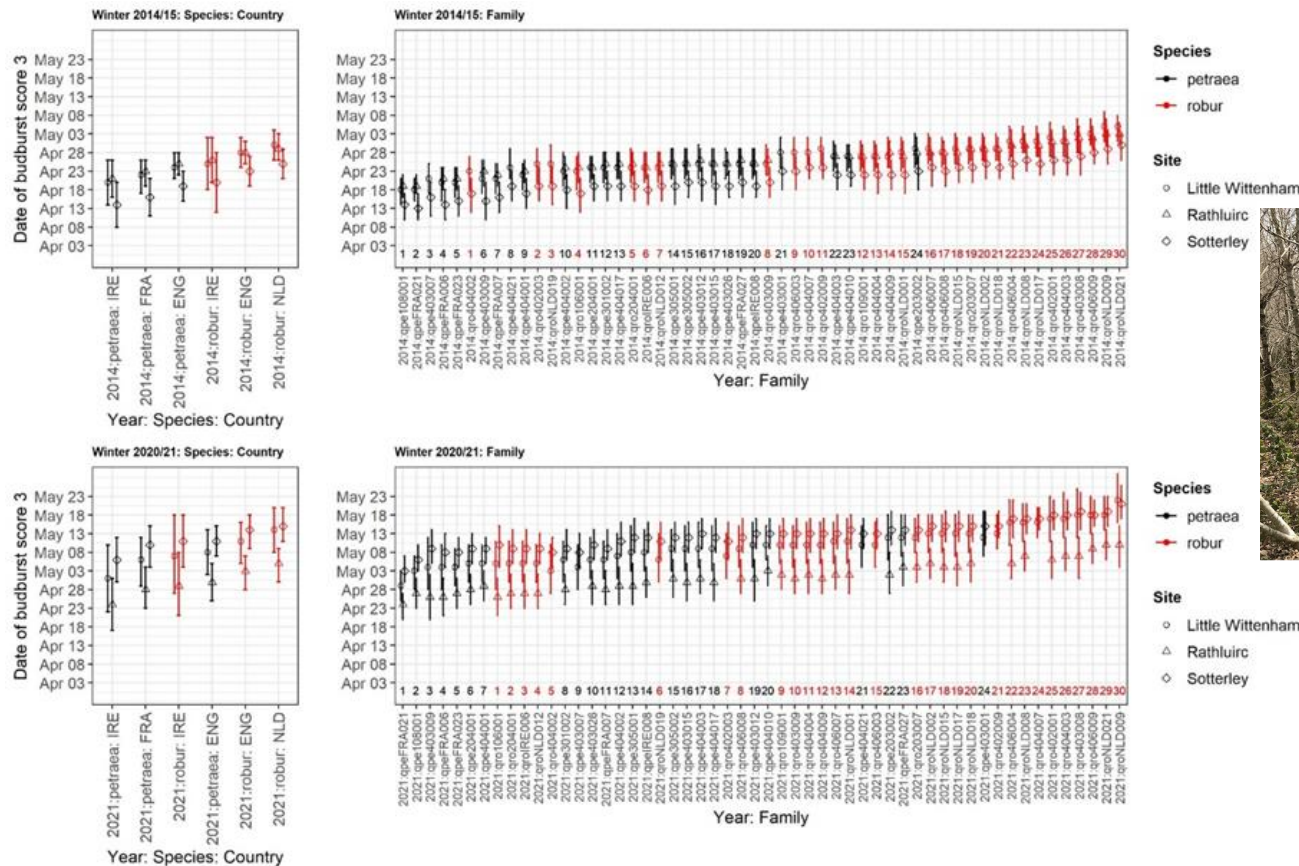
Site	County	Grid Ref	Families	Reps	Trees	Area
Sotterley	Suffolk	TM 427861	61	50	3,050	1.22
Little Wittenham	Oxfordshire	SU 553936	56	39	2,184	0.88
Shakenhurst	Worcestershire	SO 684734	21	100	2,100	0.84
Belmont	Kent	TQ 970571	34	70	2,380	0.95
Newton Rigg	Cumbria	NY 349531	40	63	2,520	1.01
Dalkeith	Midlothian	NT 368695	31	85	2,635	1.05
Bwlchgwynt	Carmarthenshir	SN 281287	44	52	2,288	0.92
Rathluirc	Cork	52° 19'N 8°	46	48	2,208	0.88

Acorns were collected from 66 of the plus trees between 2000 and 2002. Breeding seedling orchards (BSO's), combining testing and production, were established in 2003. BSO's were assessed for **Budburst**, **Height**, DBH, Apical dominance and Form in 2007, 2015 and 2021.

Rathluirc: Randomised single-tree plot design of 46 half-sib families of both *Q. petraea* and *Q. robur* replicated across 48 plots and totalling 2208 trees. Spacing is 2 x 2 m with 3 m between plots (*D. Felton.*, 2021).

Oak breeding seedling orchards

Phenology

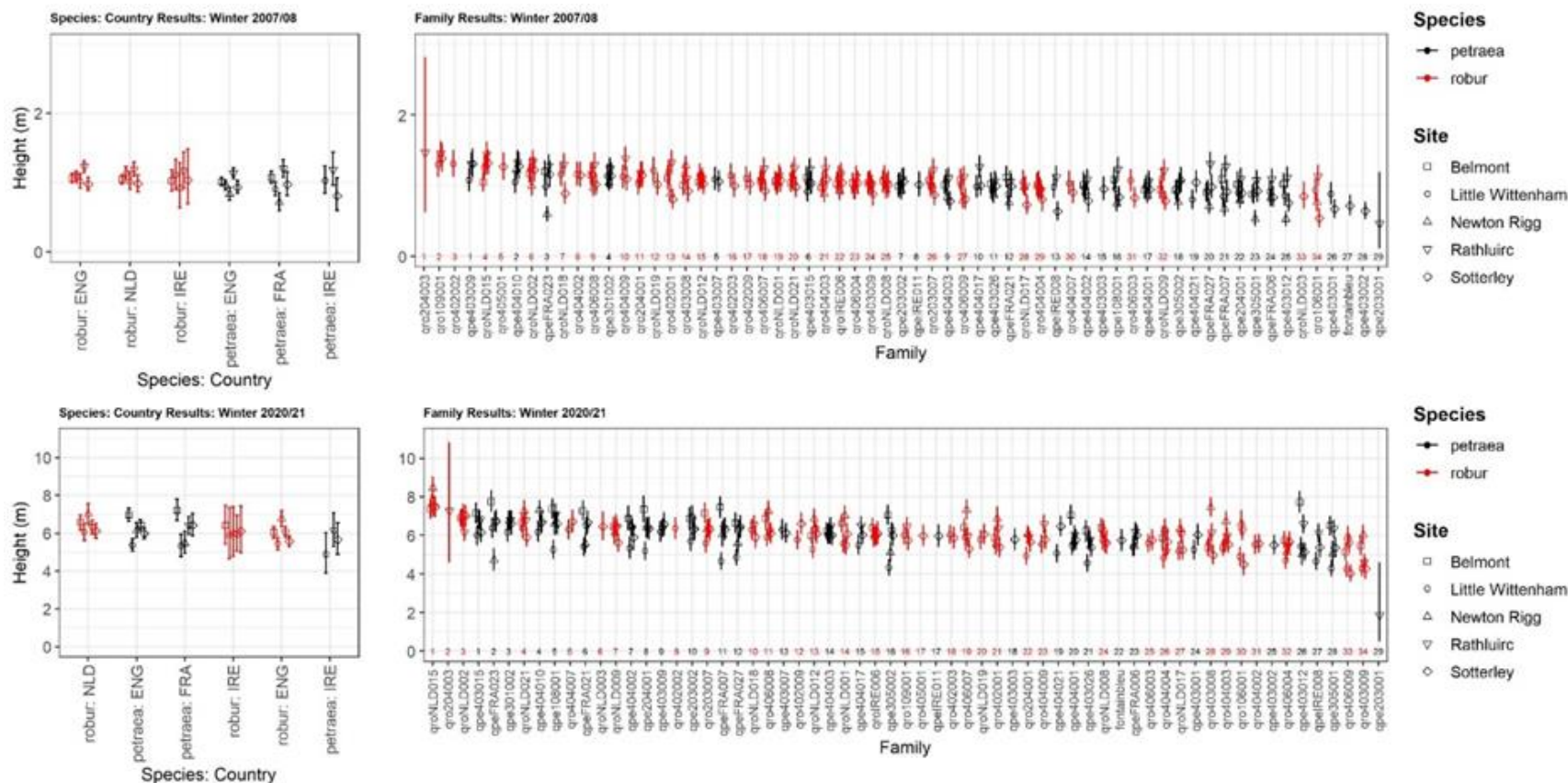


Estimated date of reaching budburst score 3 by species/country (left) and by family (right) for winter 2014/15 (top) and winter 2020/21 (bottom).



Oak breeding seedling orchards

Height



Estimated heights by species/country (left) and by family (right) for winter 2007/08 (top) and winter 2020/21 (bottom).

Oak breeding seedling orchards

Recommendations

- The results would indicate that if selecting species based on phenology, *Q. petraea* would adapt better to environmental changes due to climate change.
- Although there were differing patterns in height at different sites, *Q. robur* trees were overall taller in 2007 in English sites and *Q. petraea* trees tended to be taller in subsequent years.
- Preliminary results suggest that a BSO might be a valid strategy for the improvement of oak because of family ranking estimations.

Acknowledgements



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COILLTE
nature

