Forest Research Report 2004

WALNUT TRIALS AT LOUNT, NATIONAL FOREST

Contract report submitted in fulfilment of the

Annual Management Agreement between the

National Forest Company and the Northmoor Trust.

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Summary

This report summarises results within the walnut research trials established at Lount, and progress with research programmes planned for completion by 2006. The silviculture trials were established in 2001 and background information on these is provided within the 2002 research report (Hemery and Russell 2003). New information is provided on Phase II of the black walnut provenance and progeny trials initiated in 2002.

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Aims

1. To investigate planting mixtures that promote the growth of walnut species and hybrids in terms of stem quality and vigour, leading to a reduction in rotation time.
2. To evaluate planting mixtures which create, in line with aim one, additional financial and environmental incentives to landowners.
3. To test a wide-range collection of black walnut (*Juglans nigra* L.) material for their suitability to produce timber in the UK.

Introduction

The trials at Lount were visited by staff from Northmoor Trust in February 2005. Phase II of the black walnut provenance/progeny trial had just been planted and all trees protected with 0.75 m treeshelters. The overall appearance of the black walnut trials was excellent and maintenance standards high. Plots were identified with stakes in Phase II, but these were not present in Phase I. Plot numbers were not present.

One-year height data and survival was recorded for Phase I (EU material, P03). Phase II was measured to provide base line data and the planting plan checked and recorded.

Silviculture Trial

There has been no activity on this trial this year. The next planned assessments are for 2006/7 when five-year data will be recorded and a report written.

Black Walnut Progeny/Provenance Trial

Phase I

The black walnut trials were initially designed to encompass both progeny and provenance data. Phase I is comprised of EU material and carries out both these functions. Baseline data was recorded at planting and first year growth was recorded February 2005. Tree survival one year after establishment remains excellent at 99.6%, with only 3 trees lost from 980. Trees only grew 6 cm on average across both sites (Table1). Figure 1 illustrates mean increment growth by provenance.

Table 1 Summary results for tree growth and survival for Phase 1 (P03).

	Lount	Northmoor	Both sites
Tree height (2003)			
mean (cm)	50.3	49.8	50.1
s.e.	*1.3*	*1.5*	*1.0*
Tree height (2004)			
mean (cm)	56.5	55.3	55.9
s.e.	*0.9*	*0.9*	*0.7*
Height increment (2003-04)			
mean (cm)	6.1	5.6	5.8
s.e.	*0.5*	*0.7*	*0.4*
Survival (%)	99.5	99.7	99.6
no. dead	2	1	3

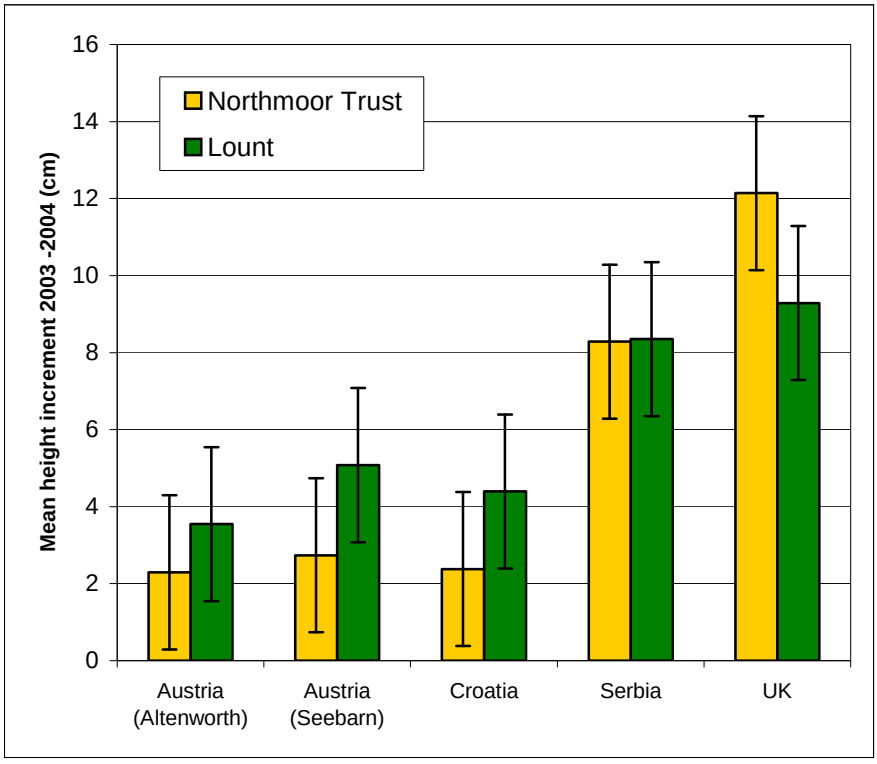

Figure 1 Mean provenance height increment of Phase I across both sites in 2004.

Phase II

Although Phase II was planned as a provenance and progeny trial, this phase contains only provenance data. Due to a mix up at the nursery, family identity was lost for the majority of seed collected in 2003. Germination was much lower than expected. Those that failed to germinate in 2004 were all floated to test for viability, and resown. It is hoped that many of these will germinate this spring, after stratification, and therefore an additional trial be planted in 2005.

Phase II was planted in January 2005 and comprises 16 reps of 80 trees. Provenances are distributed in non-contiguous multiple-tree plots within 12 replicates at Northmoor Trust and 16 replicates at the National Forest. Twenty provenances from the States, one British population and one French provenance are being trialled with two progeny, one from Italy and the other from Serbia and Montenegro (Table 2). Tree positions were assigned randomly at planting time and recorded.

Mean height at planting was 25.1 cm at Lount and 26.0 cm at Northmoor Trust. It was noted that 13 trees were probably dead at time of planting, and 10 more likely to die at Lount (13 probably dead and 3 likely to die at Northmoor Trust). These individuals were retained in the trial in the hopes that they may sprout from the base, and because their identities are required to retain the robustness of the trial design. Additional individuals of these trees may germinate this year.

Table 2 Summary of provenances and progeny included in both phases on the provenance and progeny trials.

	Planting year	Provenances *n*	Progeny *n*	Populations *n*
European collections				
Austria	2003	2	15	
Czech Republic	2003	1	15	
France	2004	1	*	
Great Britain	2003 + 2004		8	1
Italy	2004		1	
Serbia and Montenegro	2004		1	
Slovak Republic	2003	1	3	
		5	**43**	**1**
US collections				
Alabama	2004	1	*	
Illinois	2004	2	*	
Indiana	2004	3	*	
Iowa	2004	1	*	
Kentucky	2004	2	*	
Maryland	2004	2	*	
Minnesota	2004	1	*	
Missouri	2004	1	*	
North Carolina	2004	1	*	
Ohio	2004	1	*	
Pennsylvania	2004	1	*	
Tennessee	2004	1	*	
Wisconsin	2004	3	*	
		20	**0**	

Future Work

The silviculture trial will next be measured in 2006/7.

Phase I of the black walnut trial will next be recorded at five-years old (2007/8).

First year data will be recorded on Phase II of the black walnut trial winter 2005/06. Depending on germination of those walnuts still at Alba nursery, a third phase will be planned for planting winter 2005/06. Best estimates suggest around 5,000 new plants, making 2,500 available to Lount (1 ha new planting).

Northmoor Trust will make aluminium plot labels which should be attached to each stake.

Publications 2004

Hemery, G.E. (2004). Genetic and silvicultural research promoting common walnut for timber production in the United Kingdom. In: *Black walnut in a new century, proceedings of the 6th Walnut Council research symposium; 2004 July 25-28; Lafayette, IN* (ed. C. H. Michler, *et al*.). General Technical Paper NC-243, St. Paul, MN: UDSA Forest Service, North Central Research Station. 188p.

Hemery, G.E. and Clark, J.R. (2004). Promoting sustainable hardwood forestry in the UK. Quarterly Journal of Forestry, 98, 2, 121-6.

Hemery, G.E. and Russell, K. (2003). Forest Research Report 2003. The walnut trials of Lount National Forest.

Hemery, G.E. and Russell, K. (submitted). Advances in walnut breeding and culture. Acta Horticulturae.

Hemery, G.E. and Russell, K. (submitted). Advances in walnut breeding and culture in the United Kingdom. Abstract for 5th International Walnut Symposium, Sorrento, Italy. p9-13. November 2004.

Russell, K. and Hemery, G.E. (2004). A new tree improvement programme for black walnut in the United Kingdom. In: *Black walnut in a new century, proceedings of the 6th Walnut Council research symposium; 2004 July 25-28; Lafayette, IN* (ed. C. H. Michler, *et al*.), pp134-7. General Technical Paper NC-243, St. Paul, MN: UDSA Forest Service, North Central Research Station. 188p.

Russell, K., Moodley, D.J. and Tobutt, K.R. 2004. Improvement of broadleaved timber trees at East Malling Research. Handout for EMR Farm Woodland Day, 7th September 2004, EMR, Kent.

Russell, K. and Hemery, G.E. 2004. Improving black walnut for timber production. Walnut Club Newsletter No 5.

Russell, K. 2004. Seeds hold the promise of superior black walnut. Plantsman. September issue.

Russell, K. 2004. Walnuts – Why not! The National Fruit Show Handbook 2004. The Marden Fruit Show Society, p44-47.

Vaughn,S., Moodley, D.J. and Russell, K. 2004. The use of DNA markers to study native tree populations. Handout for EMR Farm Woodland Day, 7th September 2004, EMR, Kent.

Presentations

- 'Broadleaved tree improvement strategies in the UK'. Better Trees, Better Profits conference, Stoneleigh. (GH/KR).
- 4 day conference of Walnut Council Research Symposium, attended by GH and KR at Purdue University, Indiana, USA. GH and KR gave presentations at the conference.
- Presentation at sustainable forestry day, Henley (GH).
- Presentation to International Walnut Symposium (Italy) (GH)
- East Malling Research Association, Farm Woodland Day. 'A vision for sustainable forestry'. (GH).
- 'An overview of hardwood improvement through tree breeding'. Institute of Chartered Foresters, Wales. (GH).
- 'BIHIP – current approaches and the future'. Presentation to the South West Forest. (GH).