Brief Studies of Felled Yews

Anyone reading this is likely, like me, to love the sight of a living growing yew. What follows is a set of studies of a total of 53 felled yews aged from 70 to 600 years, (as well as some already described at Alice Holt) carried out over the last ten years. They cast some light on growth rates, and provide data for analysis. Though a felled ancient yew is horrible sight, these lost trees have given us an understanding of the way in which they grow which will help protect those remaining.

Aldershot

Church of St Michael visit of 1997, Toby Hindson.

The yew was reportedly wind felled, although the stump had been removed immediately and the fact could not be verified. Judging by the buttress near the cut the pictured surface was chain sawed at about one foot from the ground. The bole girth at the cut was 8'6".


AC224h

A ring count was made at the upper left hand part of the cut as pictured because the rings were clearest at that point. The count was 224 rings. Many internal roots can be seen, the largest was ring counted and found to have 48 rings. That stem very probably represented the original centre of the tree (pith). For scale: the minimum diameter across the hollow is 8 inches. The yew was 270-300 years old. Though interesting, it is excluded from analysis because the probable age is more than 20% estimation. Annual girth increase rate was about 0.35 inches, which is 0.9 cm.

Alice Holt

Alice Holt has been documented in a separate study; it runs to over 9,000 words, and includes numerous images and some maps.[1] I do not propose to write anything further here, but will include Alice Holt yews in some data sets.

AH335a is included.

All three almost complete yew stumps AH247r, AH257b, and AH251r are included as a data set in the 250-300 year old category.

All three complete yew stumps that are 151-200 years old are included as a set.

All 16 complete yew stumps between 101 and 150 years old are included.

Yews under 101 years old are not included here, neither are any yews with estimated ages likely to be more than 5% astray from reality at this stage of knowledge and analysis concerning them.

Bridge Sollars

Churchyard of St Andrews

Toby Hindson and Lesley Elphick 2003

The bole of the largest Bridge Sollars yew showing the hollow 2003.

There is a stunning yew on this site, famous for its extraordinary exposed root system. In 2003 when we visited, the yew measured 19'11" at the narrowest point of the trunk, and the base was over 21 feet, though hard to measure exactly. The yew is hollow, and at the extreme South-eastern corner of the churchyard. Following the Eastern boundary, there is a straight line of yews in a narrow strip of overgrown land. Starting from the South-eastern corner they are:

1. Wind felled and cut. BS292a 7'5"
2. Wind felled and cut. BS278r 7'2"
3. 10'8" at 3 feet.
4. 7'3" at 3 feet.
5. 12'4" at narrowest low point.
6. An overgrown non-measurable yew.

7 and 8, fallen yews, can't measure without digging.

9. 13'4" at three feet.

Not in this line, and to the North East of the church is a young yew about six feet high.

It appears that this line of yews were planted together in order to provide a windbreak for the churchyard. Yews number 1 and 2 were cut at 1' from the ground, and could be effectively ring counted. Yew 1 was 7'5" in girth at the cut, and yielded a complete count of 292 rings. Yew 2 was 7'2" in girth at the cut, and yielded 278 rings on an almost complete count. The wood on this one was more rotten than on yew 1, and some small areas were unreadable.

It is reasonable to conclude that the yews in this line are all the same age; yews 1 and 2 were probably lost in one of the hurricanes, so just before or just after 1990. In 2008 the line of yews is 292 + C18 = 310 years old, and planted in, or very near 1700CE.

The average girth of the yews measured in this line was: 116 inches (9' 8"), an overall mean girth increase rate of 0.38 inches per year, or 0.98 cm per year.

Monnington Walk is close to Bridge Sollars, and they have the same soil type. Comparisons between the sites show that the above results are in keeping with the documented assertion [2] that the Monnington walk yews were planted in 1623, about 77 years before the Bridge Sollars yews. The 42 yews at Monnington walk (measured by myself in 1998) average six inches more in girth than those at Bridge Sollars Churchyard (measured in 2003).

Cherkley Court

Researchers Andy McGeeney and Toby Hindson 1999.

Cherkley Court is a large estate in Surrey with a good deal of old yew forest remaining. It is mentioned and pictured in Lowe (1897).[3] Andy found the site and took me to see it in 1999. A lot of yew trees were brought down in the hurricane of October 1987 and many were deliberately felled at about the same time to provide timber for the veneering industry, a lot of the product reportedly being exported to Japan. The bottom fell out of the market soon after the felling was carried out, and some old boles have been left to rot, the oldest being C600 years old.

All complete stumps that were investigated are represented here, and their ring counts (complete and partial) vary from 110 to 467. The oldest cut bole is also the largest, measuring 15'11", or 4.85 meters at the basal minimum. Like many of the old yews on this site, it had large swellings at the base of the branches, distorting the girth measure at three feet. The regularly shaped lower few feet of the bole yields the correct measure. The centre of the bole is unreadable, destroyed by over 50 internal stems running down the central rot. They vary from about finger to wrist thickness, and grow in an area 4'4" in girth. Many rings are clearly lost in this mass, the best estimate based upon other complete stumps on site suggests that 134 is a likely figure. These researchers are confident that this is quite an accurate ageing, and consider that ring counts over 300 are rare enough to be valued as partial data. The reference coding created for Alice Holt has been used to identify the individual boles. CC represents the site code, the number represents the ring count, "a" represents a clear and complete count and "r" represents an incomplete count because of a rotten core.

List of single stemmed cut yews studied at Cherkley Court

		Rate (inches)	(Ring count ages are a minimum age)	
CC144a	Girth at cut 5'9"	0.48	(1.2 cm)	
CC110a	Girth at cut 5'6"	0.6	(1.5 cm)	
CC196a	Girth at cut 8'10"	0.54	(1.4 cm)	
CC168a	Girth at cut 7'7"	0.54	(1.4 cm)	
CC165a	Girth at cut 5'4"	0.39	(1.0 cm)	
CC170a	Girth at cut 5'3"	0.37	(0.9 cm)	
CC193a	Girth at cut 8'9"	0.54	(1.4 cm)	
CC467r	Girth at cut 15'11"	0.32	(0.8 cm)	(Calculated age 601 years)

Multi-stemmed yews where a single cambium does not encircle the stump, highest counts.

CC135am	Girth at cut 9'6"	0.84	(2.1 cm)
CC188am	Girth at cut 10'6"	0.67	(1.7 cm)
CC135am	Girth at cut 7'2"	0.64	(1.6 cm)

Stems that are clearly separate but growing fused together are included above as multi-stemmed, the reference code “m” has been created to represent this phenomenon. Stumps that show multiple centres which have completely integrated, i.e. have at least one clear continuous growth ring round the whole circumference, are included above as single stemmed.

Mean Growth rates (single stem) in inches girth increase per year.

101 to 150 years	0.54	(1.4 cm)
151 to 200 years	0.48	(1.2 cm)
CC467r (600 years)	0.32	(0.8 cm)

Mean growth rates multi stem

101 to 150 years	0.74	(1.9 cm)
151 to 200 years	0.64	(1.6 cm)

Felled 190 year old yews at Cherkley Court 1999

CC467r in 1999. It is over 20 feet in girth at the widest part of the bole.

Section of internal stem from CC467r against a cm scale

Farringdon Churchyard in Hampshire

Toby Hindson 1998

There is a line of yews on the North boundary of the churchyard. Five have been felled quite recently, and ring counts were possible on four of them. The fifth was too rotten and may have been felled at an earlier date. Girths are at base.

		Annual girth increase, inches	
FC98a	Girth 3'8"	0.45	(1.1 cm)
FC95a	Girth 2'3" Twin trunks, fully amalgamated.	0.28	(0.7 cm)
FC102a	Girth 4'8" Wind felled before being cut.	0.55	(1.4 cm)
FC90bx	Girth 6'6" at base including some resistant ivy. Ring count was 90, but counted on the cut which was 5 feet from the ground. Last in line at the NE corner of the churchyard. Regenerating fast. Rate assumes 102 rings.	0.76	(0.9 cm)

Mean annual girth increase: 0.51 inches, 1.3 cm.

There are many yews still standing in this line, all clearly planted at the same time. They were planted about 1890.

Herriard Sawmill- Brecon Beacon yews

Toby Hindson 1999

On the Alton to Basingstoke road in Hampshire lies Herriard Sawmill. Driving past on the way to work, I noticed a huge stack of tree trunks ready to be sawn, and realised that they were yew. I spoke to the owner, and he kindly gave me leave to ring count and measure them, even getting his chainsaw out to cut the end off the oldest bole so that I could get a good count. I like people like that. He informed me that the wood came from a wooded hill in the Brecon Beacons, but was unsure of the exact location. I ring counted ten yews, choosing timber of varying size and without central rot. I was then late for work.

Yew boles at Herriard sawmill 1999

Herriard yew boles

Bole	Girth at cut	Rate (inches)	Rate (cm)
BB110a	2'10"	0.31	0.8
BB99a	4'4"	0.53	1.4
BB100a	4'2"	0.5	1.3
BB141a	5'10"	0.5	1.3
BB118a	4'8"	0.47	1.2
BB113a	4'2"	0.44	1.1

BB137a	4'8"	0.41	1.0
BB109a	3'2"	0.35	0.9
BB84a	3'0"	0.42	1.1
BB278a	7'7"	0.33	0.8

Mean girth increase rates

Age	Inches per year	Centimetres
50-100 years	0.36	0.9
101-150 years	0.41	1.0
278 years	0.33	0.8

BB278a, the oldest bole ring counted at Herriard Sawmill 1999

Hogs Back, Guildford.

Toby Hindson 1997

The felled yews are in the wood below the car park and picnic area on the South side of the hill. The stumps investigated so far are along the southernmost edge of the wood. All the yews were felled some time ago, no sawdust remains, and a lot of the stumps are starting to decay and become white and pulpy on the chisel cuts, though they are not far enough gone to break up. Where there is regeneration it is bushy and about six inches high. The stumps were likely cut about ten years ago. Measures are taken at the base.

Starting before the Eastern corner of the Southern slope, a few yards from where the edge of the wood does a right angle downhill.

HB102a Girth 6'2" Regenerating.	0.73	(1.9 cm)
HB99a Girth 3'5"	0.41	(1.0 cm)
HB113a Girth 5'8"	0.6	(1.5 cm)
HB84ra Girth 3'9"	0.5	(1.3 cm)

centre half inch missing, probably a loss of 4-8 rings.

HB97a Girth 3'8"	0.45	(1.1 cm)
HB114a Girth 4'2"	0.43	(1.1 cm)

Regeneration, close to a big ash stump.

HB67a Girth 1'7"	0.28	(0.7 cm)

Bound with the ash stump mentioned in HB114a

HB88a Girth 3'8"	0.5	(1.3 cm)
HB123a Girth 6'1"	0.59	(1.5 cm)

four centres, closely integrated. Regeneration. Touching holly stump.

HB114a Girth 3'7"	0.38	(1.0 cm)

Also associated with holly stump in HB123a.

HB115a Girth 6'4" Cut high.	0.66	(1.7 cm)

Mean girth increase overall: 0.5 inches, 1.3 cm. Mean age: 102

Many yews still grow in the wood, all apparently much of an age with those that have been cut down. There are a number of older yews up to 13'6" in girth on the central reservation of the A31 Hogs Back, investigated by myself and Mike Turner.

Merdon Castle

Toby Hindson 1998

A small girthed yew was felled beside the lane at the entrance to Merdon Castle near Winchester in 1998.

The girth was 5'3" and the ring count and age was 133. Annual girth increase: 0.47 inches, which is 1.2 cm.

MC133a in 1998

Newlands Corner

Toby Hindson 1997

NC201ar in 1997

At Newlands Corner near Guildford a yew was wind felled (hurricane of 1987?) and later cut up. It was 100 yards south of the main hilltop car park in mixed woodland containing yew groves. The girth was 7'8" and the ring count (almost complete, a small section at the centre was rotten) was 201. The yew was C210 years old.

Annual girth increase: 0.44 inches, 1.1 cm. Age 210 years.

Priors Dean

Toby Hindson 1997

This felled yew is among the large yews in the sunken lane a few hundred yards above Priors Dean church.

PD67a Girth 3'2" at base, cut at 3 feet. 0.56 ins pa, 1.4 cm pa.

The following stumps are on a wooded down land spur on the Priors Dean to Hawkley road where the O/S map shows a steep incline on the road. The incline is signed as 1 in 5 on a road sign. As you go down the hill, The Warren is to the right, and the woodland in question is to the left. The soil is down land chalk. Measures are at base.

	Mean annual girth increase	
PD79a Girth 2'7"	0.39	(1.0 cm)
PD70bx Girth 2'6" at 3 feet, base obscured.	Omit	
PD123a Girth 5'11"	0.58	(1.5 cm)
PD134a Girth 5'9"	0.51	(1.3 cm)
Double centre, fused into a single.		
PD106q Girth 5'0" multi centre, hard to read.	0.56	(1.4 cm)
PD80a Girth 2'9"	0.41	(1.0 cm)
PD91a Girth 4'10"	0.63	(1.6 cm)
PD89hx Girth 9'0"	Omit	
Cut into buttress, hollow centre 13" in diameter.		
Outer growth fast compared with others on site.		
PD138a Girth 6'0"	0.52	(1.3 cm)
PD124a Girth 7'10"	0.76	(1.9 cm)

There are many more yews still standing in these woods.

Mean site girth increase rate: 0.54 inches, 1.4 cm. Mean age: 109 years.

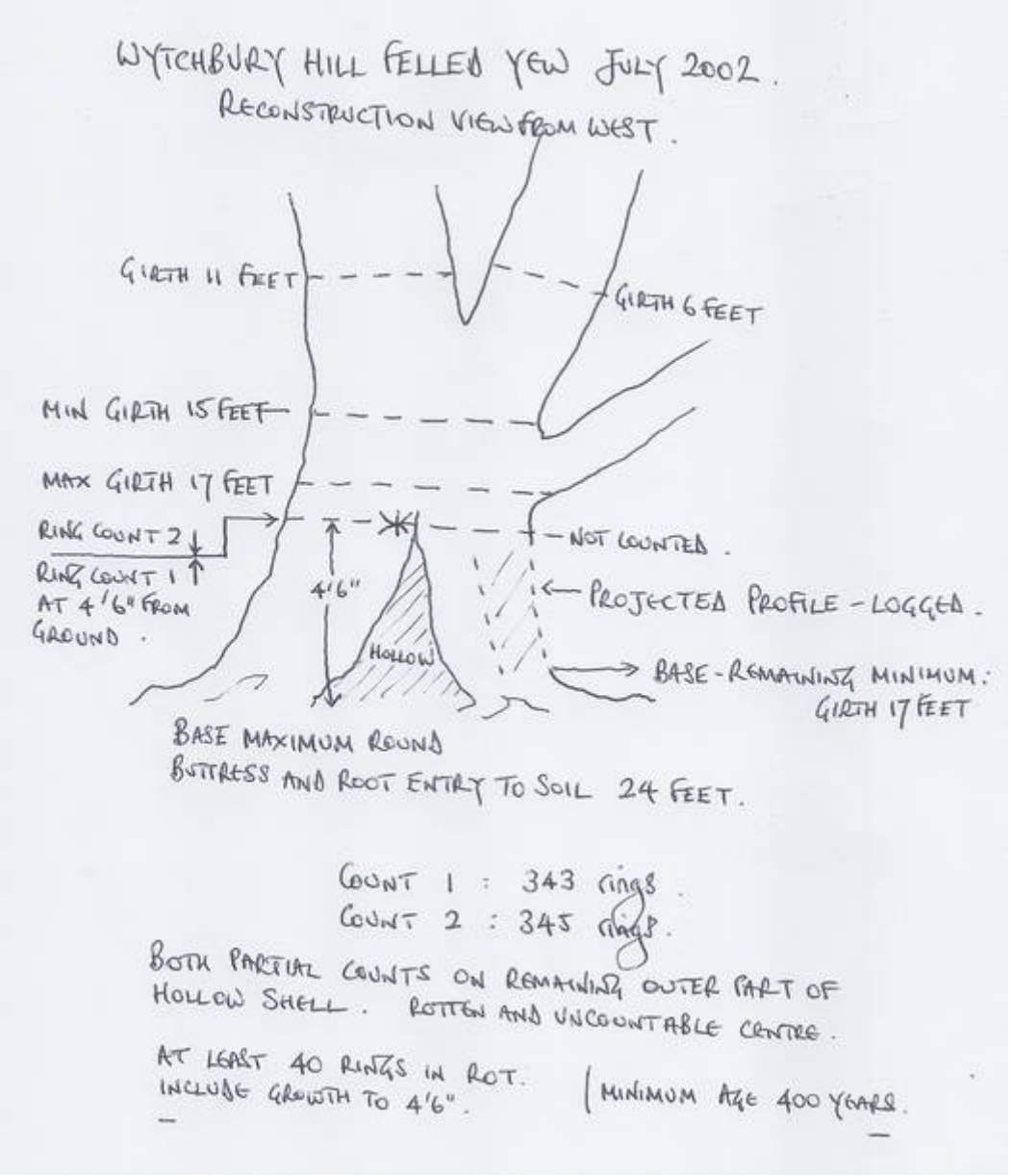
Wychbury Hill

Toby Hindson and Robert Bevan-Jones 2002

This "mission" was suggested and organized by Rob, who discovered that the yew had been felled. He made a heroic effort in getting to the site, his health not being the best at the time.

The tree is pictured (felled) in Fred Hageneder's book *Yew, a History*.[4] Fred describes the circumstances of the felling: the yew was "struck by insurance policies". The yew was deemed "unsafe", and therefore felled.

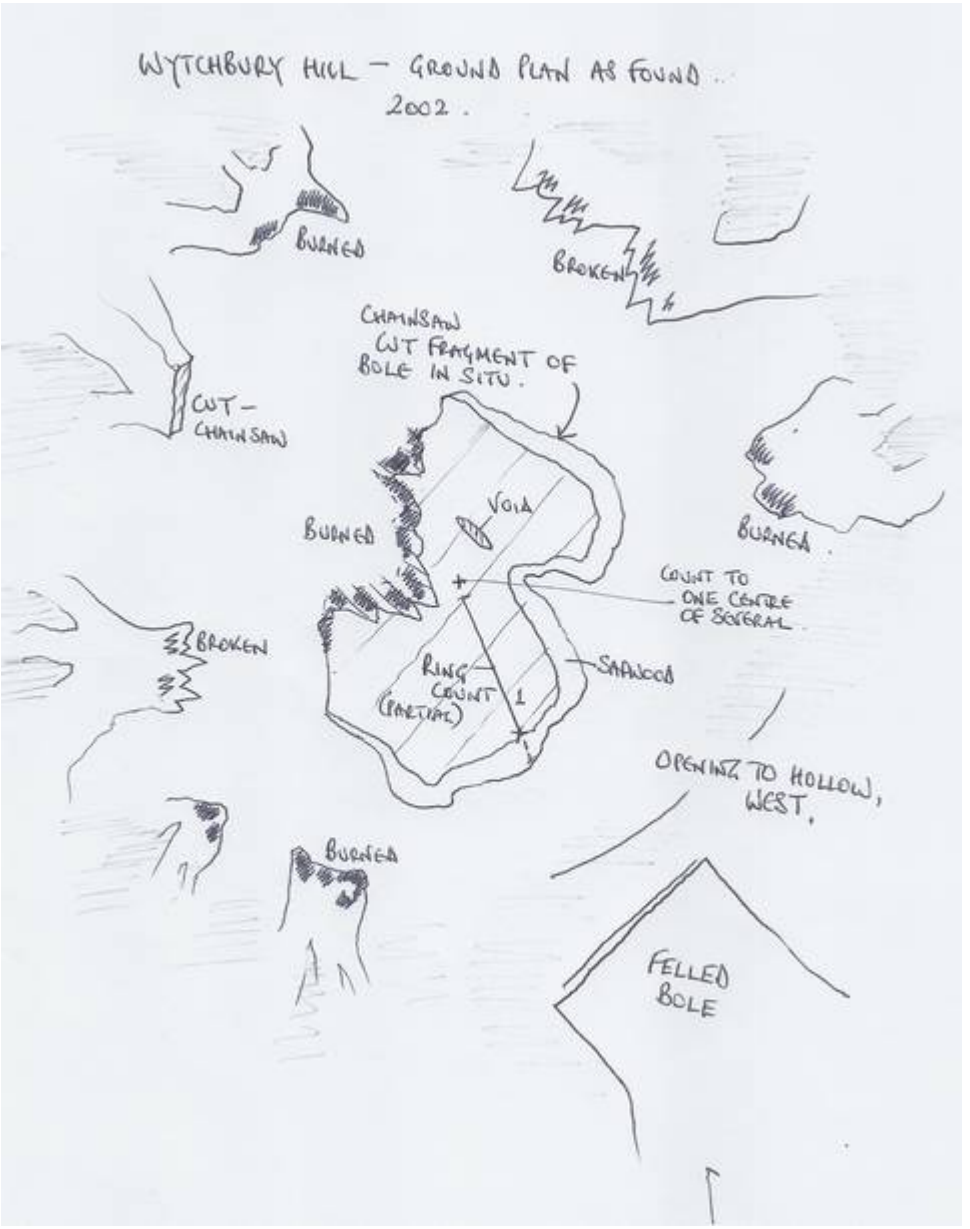
Field notes Wychbury page 1



The yew stood on the highest part of the earthworks, in mixed woodland, and when we reached it we found a long upper bole which was largely intact separated from the base at four and a half to five feet from the ground, and the remainder of the lower bole had been

logged and burned. Sufficient remained to do partial ring counts, though, to be representative of a large part of the yew's radial growth at breast height. The useful section was a single incomplete round from that level which remained largely unburned; lying loose in the centre of what was once the hollow of the yew.

Field notes Wychbury page 2



The tree is reconstructed as being uneven in bole, but on average about 16 feet in girth. The ring count was 345, with some rotten radius at the centre which would have probably yielded over 40 more rings. The centre found may not have been the centre of the main stem, but a good deal of the probable radius is represented by the count. In addition to the count of C385 rings so far, one must take into account the fact that trees do not start growing at breast height above ground, and a further minimum of 10 years must be added to the age on that account. An absolute minimum of 395 years is the certain baseline age for the yew.

Additional factors include the possibility that the yew was held back by grazing, almost a certainty if the yew was wild grown. The grazing factor can increase the age substantially, 40 years or more not being uncommon. Several good examples exist at Newlands Corner and Alice Holt where the size of several small (foot high) grazed yews remains largely unchanged in the 15 years that I have been observing them so far. It is unknown how long they have been in this condition.

A further factor involves the possibility that the centre of the yew was not found, and the apparent centre that was counted towards represented an engulfed branch, another very common feature of yew trees. Given the girth of the yew, and the possibly partial radius, another 40 to 80 years can be suspected. The upper limit for the age of the felled bole is just over 500 years. The yew was 400 to 500 years old in round figures, and 16 feet in girth.

The base of the yew had a considerable spread compared with the girth on the upper trunk, reflecting the fact that the lower bole had gone hollow up to about five feet from ground and was under mechanical stress from the weight of the tree and the strong winds on the hilltop, though the wind forces will have been somewhat ameliorated by the surrounding woodland.

Approximate mean annual girth increase rate for this yew:

(Maximum, aged 400) 0.48 inches, 1.2 cm.

(Minimum, aged 500) 0.38 inches, 1.0 cm.

Summary statistics, single stemmed yews.

Overall annual growth rates by site and age

Site	mean age	n=	rate cm
Priors Dean	67	1	1.4
Priors Dean	83	3	1.2
Brecon Beacons	94	3	0.9
Farringdon	102	4	1.3
Hogs Back	102	11	1.3
Brecon Beacons	121	6	1.0
Priors Dean	125	5	1.5
Cherkley Court	127	2	1.4
Merdon Castle	133	1	1.2
Alice Holt	138	16	1.4
Alice Holt	153	3	1.3
Cherkley Court	178	5	1.2
Newlands Corner	210	1	1.1
Brecon Beacons	278	1	0.8
Alice Holt	280	3**	1.1
Aldershot	285	1x	0.9
Bridge Sollars	310	6*	1.0
Alice Holt	340	1	1.0
Wychbury Hill	450	1e	1.1
Cherkley Court	601	1	0.8

*Sample includes 4 standing yews planted at the same time and on the same site as 2 ring counted yews.

** Good ring counts, one almost complete stump, and estimated no more than 20 % of total rings on two. Estimates thought to be within 5% of reality.

e Estimated to be in all probability 12.5% higher in age than ring counting and firm facts can ascertain.

x Excluded because over 20% of the probable age is estimated.

Various observations can be made about the data; the most striking is the lower growth rate of the Brecon Beacon yews compared with yew samples of similar age.

Graduated Table of Mean Total Girth Increase Rate by Age

Inclusive of all the single stem yew data in this report, and separating Southern and Brecon Beacon sites. Alice Holt is excluded so that it can be compared.

Sites in the south of England (All sites except Brecon Beacons and Alice Holt)

Years	mean age	n=	rate, cm	Brecon Beacons, rate	Alice Holt, rate
0-50	-	0	-		
0-100	79	4	1.3	0.9 n=3	
101-150	111	23	1.3	1.0 n=6	1.4 n=16
151-200	178	5	1.2		1.3 n=3
201-250	210	1	1.1		
251-300	-	0	-	0.8 n=1	1.1 n=3
301-350	310	6	1.0		1.0 n=1
351-400	-	0	-		
401-450	450	1	1.1		
450-500	-	0	-		
501-550	-	0	-		
550-600	-	0	-		
601-650	601	1	0.8		

A very important caveat applies to these figures, especially when considering graph construction. Look at the table above. Was CC467r, the 601 year old yew increasing its girth at 0.8 cm per year at the time it was felled? The answer is almost certainly no. The figure is a total growth rate over its whole life. It is essential to understand the point in order to interpret the chart effectively. To know the final rate of growth it is necessary to consider the concept of "Recent Rate" explained in my Alan Mitchell Memorial Lecture paper (revised). [5]

To explain; the yew can be compared with others on the site. The second oldest category at Cherkley Court reached a mean age of 178, and a mean girth of 7'2" or 218cm.

The girth difference between this mean of 7'2" and 15'11", the girth of CC467r is 8'9' (267 cm). The difference between the mean age of 178 and the age 601 for CC467r is 423 years.

CC467r probably increased its girth in the region of 8'9" or 267 cm in 423 years.

The rate over this period is 0.6 cm girth increase per year rather than 0.8 cm. The first 178 years of CC467r's growth has been statistically discarded, illustrating the point that "Recent Rate" differs from overall rate, in this case by 25%.

There is an obvious progression in the data that leads one to suppose that 600 years is a reasonable base age estimate for a 16 foot girth yew. It also seems that a reasonable assumption for growth rate over 16 feet is 0.6 cm girth increase per year or a little less. That would make a 22 foot girth yew something like 1000 years old. The truth is more complex, however, the growth rates vary according to the state of the tree especially with regard to hollowing, and the growth rate drops off faster from 12 to 16 feet in girth than this data reveals. More on the subject can be read in the Alan Mitchell Memorial Lecture paper (4), which contains more data from other sources, and deeper analysis.

References

1 Hindson, T. (2008) The Yews of Alice Holt, AYG website.

2 Anon, (1933) Transactions of the Woolhope Naturalists' Field Club Herefordshire.

3 Lowe, J. (1897) The Yew-Trees of Great Britain and Ireland, Macmillan

4 Hageneder, F. (2007) Yew a History, Sutton.

5 Hindson, T. (2007) The Allen Mitchell Memorial Lecture 2000, revised 2007 (The Growth Rate of Taxus baccata: An Empirically Generated Growth Curve.), AYG website.