**The Trees of the Downs.**

**Part 1 The species**

**Introduction**

I describe 80 tree species or varieties that grow on the surface of the Downs. I have omitted some woody species, including Gorse, Wild Privet*, Lonicera Nitida*, Snowberry, Cotoneasters, Lilac, that only forms part of a hedge and the Monkey Puzzle tree that is dying. The oldest tree is probably 200 years old, though some of the Hawthorns may be older, and new trees are planted almost annually.

Trees fall into five groups. **Avenues**. The earliest map of 1746 showed avenues along the toll roads across the Downs, but early drawings make clear that at that date most of the Downs and most of the slope to the river were more or less treeless. These avenues have continuously been replanted down the years by successive generations. Their original purpose was to act as guides across a trackless space. The species that make them up form a palimpsest of attitudes to tree species over the years. There are 29 species in the 21 avenues that can be found on the Downs, and their girths vary from 510cm to 20cm. The most frequent now are Small-leaf Lime, Horse Chestnut, Common Lime and Beech. The Westbury Road avenue at 1400 metres is the longest in Bristol, and the total length of all the different avenues on the Downs is just over nine kilometres. There are some 900 trees in the avenues, and history of them has been written separately.

The second group is the trees on the **face of the Gorge**. They have, for the most part, been self-sown, and successive pictures of the Gorge face show a steady growth in the density of cover, especially in the years since 1939. There has been extensive management of the steepest sites to remove Holm Oak and Cotoneaster and other scrub and to open up the area to the rare native species. Much of this work is now done annually using ropes. This management follows the Bristol University 19 volume report published between 1985 and 1995. This report was overseen by Prof LC Frost, with the help of L Houston and SD Micklewright. Since 2012 the Gully has been fenced by Natural England, many trees felled, and the goats introduced to eat down the scrub, and, it is hoped, enable the limestone grassland species for which the site was once famous, to recover.

The third group is the trees of **two woodlands.** The Ash Wood on the northern edge of the Downs, which has a number of veteran Ash trees, was clearly already in existence in 1861 despite the sheep grazing. The second wood is along the Zoo Banks, on the slope opposite the Zoo that includes a dying Monkey Puzzle and a large number of Holm Oaks and Turkey Oaks that may have been planted.

The fourth group covers all the trees **that have been planted**, some as memorials to individuals, some by local organisations such as CHIS. They include the well-spaced trees of Clifton Green, the planting around Proctors Fountain, the Beeches around the Gloucester county cricket Ground, the Seven Sisters and the various plantings in the Westbury Park area.

The fifth group is the **trees of the scrub clumps** that are now widespread across the area of the Downs that is not in more or less full-time use for sports pitches. At the heart of many clumps is or was a veteran Hawthorn, It is unclear what the circumstances were that allowed the Hawthorns to grow despite the grazing sheep. The Hawthorns were famous a century ago and people would come from miles around when they were in flower, but almost all have succumbed mainly to old age and Ivy strangulation. A wide variety of species are now part of these clumps and they have grown up as a result of the use of mowing, which cannot get at the base of the trunk of a Hawthorn the way a sheep would. This scrub has spread rapidly since 1939. The old mining area called the Tumps used to have no trees in it at all, but is now almost impassible. The clumps readily coalesce, and the grass area of the downs is visibly diminishing. But the Scrub provides excellent habits for birds and insects. There is a ten-year scrub plan to control the situation which has been begun.

**Phenology**

I have been studying the phenology of the plants and trees since 2003, and recorded key details including bud break, flowering, fruit ripening, leaf turn, leaf fall, and becoming bare, which also gives the total growing season. Trees create an annual record of the impact that the weather has in their growth rings, and have been used, in the absence of weather data, as a method of recording climate change.

A striking result of my observations has been the very great range of dates for first flowering and other key annual events that trees show. Almost all species show a range of around 40 days for all the key annual indicators, and this reflects the fact that over the 14 years the average variation in monthly maximum temperature during the growing season has been 4.7C degrees, with a range from a minimum of 3.0 degrees for May, to a maximum of 7.4C for July. These figures are very much larger than any change in the thirty-year average, or climate, which annually has only varied by a degree over 150 years. In general, my observations suggest that a degree change in temperature creates a ten day change in the date of an event.

**Girth and Age.** Trees create a new growth ring every year and hence a trees girth increases every year. The size of the increase varies with the weather, the habitat and the species but on average over time averages at 2.5cm a year. But, when young, trees will grow much faster, and in old age much slower. I have identified the Downs Champion tree based on girth for each species, and compared it with the Bristol and the national champion. A number of trees on the Downs were planted in memory of specific people on specific dates, and the majority of the present trees were planted as replacements for the Huntingdon Elms trees, themselves planted c 1880. It is possible to create growth curves for the major species. Horse Chestnuts are the fastest growing, Oak the slowest. The largest and oldest trees on the Downs are Ash, Oak, Holm Oak, and Large-leaf Lime, probably up to 150 years old. The veteran Hawthorns may be much older, as they grow much more slowly than trees, and most of the most ancient are multi-trunked, precluding a girth measurement. A hawthorn with a girth of one metre is likely to be a century old, whereas a tree may be twenty. Measured growth rates for different species on the Downs have varied from 2.5cm/pa to 7.0cm/pa. The Beeches and Small-leafed Limes planted in c 1980 to replace the Elms both have an average girth of 160cm, a rate of 4.0cm/pa. The range of girths for trees planted as replacements in around 1980 is considerable. For the Limes from 240cm to 150cm girth and for the Beeches 180cm to 130cm. The age of the Common Limes on Stoke Road and Westbury Road is more difficult to assess. Their average girth is two metres, which, if it is right to assume a growth rate of 2.0cm pa, which is what the Common Limes around Clifton College have achieved, suggests they would be about a hundred years old. But it is odd that the same girth has been achieved by many of the trees planted forty years ago. It is certain that they pre-date the Second World War.



Chart 1 Average growth curves for trees on Bristol Downs. Girth is the vertical axis, age the horizontal.

Chart 1 is based on the average of available figures for Beech, Small-leaf Lime, Common Oak and Horse Chestnut. The range of the circumference for individuals of the same species and age of planting can be up to a metre.

**Distribution.** The Downs has 204 hectare squares that have trees in them, and they each hold between 1 and 30 tree species. The average is 11. The most species rich hectare is ST563 739. For each species I give a figure showing the percentage of the hectare squares of the Downs in which the species can be found and compare it with the distribution in the wild in the region as published in the Flora of the Bristol Region published in 2000, and simply referred to as Flora 2000. The coverage of tree species was in many cases rather poor. This is a repeatable measure of change. There are 27 hectare squares with 20 or more species.

The development of trees on the Gorge face has been steady for the past century, and its present structure was derived from five transects down the face. These were the Tramway, the new ZigZag, Bridge Valley Road, the Mousehole path and the Zigzag. A rough count was made of the species within ten metres of the route. 23 species were recorded, but four made up two thirds of the total. They were Ash, Hazel, Sycamore and Yew. As there is little evidence of species being planted, apart from the Black Pines, it was interesting that seven alien species had become established. They were Bay, Buddleia, Holm Oak, Laurel, Laurestinus, and Norway Maple. Only two Whitebeam were encountered, though their distribution in the Gully shows that they are in fact quite widespread, but struggle to survive the shade created by the fast-growing Ash and Sycamore.

**Biodiversity value.** All trees have some biodiversity value in that they provide other species with a source of food. One way to measure this is to seek to discover how many pests and diseases are associated with a tree, because that means that other organisms find it useful. Most native species have a wide range of insects that use them, whether it is obtaining nectar from them, eating their leaves, using their bark as a growth platform, or nesting in their branches, and a number are host to quite species-specific types of aphid or plant galls or leaf miners, and most are associated with specific fungi in the soil. Most trees are also associated with a variety of lichens, and old trees will have mosses, and some even enable other plants to grow on them. These are called epiphytes. Alien trees inevitably normally have fewer native species that use them, and for many the research has not yet been done. Species that are grown commercially obviously want the minimum of pests and diseases. Many trees provide nectar, and most have seeds or fruit that are eaten by birds and mammals. For common species I note the Biodiversity value as high, medium or low.

**Vital Statistics.** For those species for which I have the data, mostly the commonest ones, I give information on such key points in the year as Bud Break, Flowering, Ripening, First Leaf fall, Autumn Colour turn and becoming Bare. The time between bud break and becoming bare is the tree’s growing period, and this can vary from year to year by as much as 30%. In each case the average date is given first, which is the average of the period 2003-16, followed by the range of dates within in which the event lies, and in some cases the duration of flowering or of ripe fruit occurring. Recording the timing of events is to a degree subjective, but they have all been made by the same person at the same place, which gives them a degree of reliability. All the events are part of a process. The first Flower means that the stamens are visible, and is the most accurate figure. Becoming Bare is also fairly precise. Every year is different, and the climate is clearly changing. Recording this data is vital to understanding the impact of weather, and hence climate, on tree activity. Our summers are, at present, too short and too cool for many of the foreign species we have to ripen their fruit, and hence they do not naturally regenerate. But, interestingly, this is also true from some native species, particularly Lime. The vital statistics are given so that in future change can be noted and measured.

**Regeneration.** Trees have several methodsof ensuring their future. All trees produce seeds, but in this climate many of them do not ripen fully, and only a proportion lead to large numbers of seedlings or saplings. Trees that are not native usually do not produce viable seed, though a few, such as Horse Chestnut, do. Some native species, especially the Large and Small-leaved Limes very rarely produce seedlings, because our summers are now too cool. The species that regenerate readily are Ash, Beech, Cherry, Hawthorn, Hazel, Holly, Holm Oak, Hornbeam, Sycamore, Wych Elm, Yew. Others will regenerate, but less often. They include Horse Chestnut, Laurel, Oak, Turkey Oak, Spindle, Walnut, and Whitebeam.

Some species also reproduce by suckering. They include Blackthorn, Cherry Plum, Common Elm, Dogwood, Ailanthus and Robinia.

Some species produce new shoots from their base, and become multi- trunked. They include Hawthorn, Holly, Hazel and Common Lime.

Some species have boughs that develop a weeping form, grow downwards to form an apron around the tree, and, where the boughs reach the ground, they produce roots, a process commonly used by gardeners and called layering. New trees then grow up to form a grove around the parent tree. All of these forms of regeneration can be seen on the Downs.

**Moment of Glory.** The importance of trees as a visual amenity is, in towns, very considerable, and one of the reasons for the passion that is often aroused when they are threatened. There is an increasing effort to create a system of giving them a financial value as an asset, which includes the value of their shade, the way they cool the atmosphere, the way they absorb pollution, and carbon dioxide, there use as a visual barrier to motorways or rail lines, their use in binding slopes, and affecting flooding, and offering wind and, to a lesser extent, noise protection. Most trees have a point in the year when they are at their most dramatic, and I have tried to identify this.

Species are listed roughly in the alphabetical order of their common English family names starting with Ailanthus and Apple, and finishing with Yew.

**1 Tree of Heaven** *Ailanthus altissima.* This tree comes from China and was brought to Britain in 1751. It grows fast, and is famous for putting up suckers, often at great distance from the mother tree. In Germany it is regarded as a major menace in towns for its ability to take over waste ground. It is fast growing, but short lived, and the two largest in Bristol, one near Proctor’s Fountain, the other in Victoria Square both recently suffered catastrophic collapse. There are three specimens on the Downs, two on Clifton Green and one by Proctors Fountain. It has long pinnate leaves like an ash, but between 30 and 90 cm long, with a terminal leaflet, which appear very late on May 2 (range 46 days, Apr. 17 to May 26). Trees are either male or female. The whiteish flowers bloom on panicles up to 50cm long in the first week of July and last for about a month. The male flowers are much more conspicuous than the female, and, like the leaves, give off an unpleasant smell. The seeds have a circular wing, called a samara, which becomes twisted to assist wind dispersal, and a central seed, rather like an Elm, which turn bright red as they ripen. They are held upright in large bunches which may have hundreds of seeds. The leaves become yellowish in the autumn and start falling on Oct. 15 (Range 31 days, Sep. 25 to Oct. 26.) They are bare by Oct. 30 (Range 48 days, Oct. 14 to Dec. 1). The average growing season is short at 174 days, with a wide range of 77 days from only 125 to 202. The tree on the Promenade left a sucker, with twin trunks, which is growing well about 50 metres from the original, close to Proctors Fountain, at ST5661 7382. A young tree grows on Clifton Green, at ST5686 7331 close by the road. It has a girth of 200cm and is now the largest in the city. There is another in the middle of the Green. There are specimens in Canford Cemetery, Blaise, Oldbury Court and Kings Weston. Moment of Glory, early October as the seeds turn red.

**2 Apple *Malus domestica.*** The species probably originated in central Asia, and has beenwidely cultivated for many centuries. On the Downs it is found in 10% of the hectare squares. Biodiversity value, high. About four trees were planted in the 1930s on the northern lip of the Gully at ST562 746 as part of efforts to make the Downs more attractive, and they have become sprawling trees, competing with a variety of scrub species, but also now serving to screen the Goat enclosure. All the others are the result of apple pips germinating where the apple core was thrown, several on the lip of the Gorge. They come into flower on April 18 (range 41 days from Mar 30 to May 10). The attractive pink and white flowers only last three weeks. The first fruit ripen on Aug 7 (range 69 days, between Jul. 16 to Sep. 22). They tend to stay on the trees until as late as November. Apples become bare by Nov 27 (range 38 between Nov 8 and Dec 16). They grow slowly, and never become tall. They are host to a wide variety of insects and fungi, and the fruit are eaten by a very wide variety of birds, mammals and insects. Moment of Glory, in flower in late April.

**3 Ash** ***Fraxinus excelsior*.** Native. Present in 90% of the region and in 64% of Downs hectares. Biodiversity value, high. This is the second commonest tree species (to Hawthorn). Ash trees love limestone, and it is the dominant species of the face of the Gorge, and there are at least 45 trees that are over a century old. The national champion has a girth of 880 cm, the largest girthed Ash in Bristol is in Henbury with a girth of 470 cm. Four trees on the surface of the Downs have a girth of 420cm and are at least 170 years old. One is close to the Pound, at ST5689 7437 and others are in Westbury Park, beside the old Bakers Road and on the Zoo bank. One or two old trees are incorporated into the main avenues, possibly implying that they may have formed the earliest avenues. One collapsed in 2017. Its stump remains where the Bakers Path crosses the old toll road at ST5663 7469 with a girth of 360cm, and there is another on the Stoke Road avenue by the Café. On the Westbury Road there is a magnificent decaying stump at ST5727 7564 with a girth of 360cm. There are also a number of veterans in the Ash wood on the northern tip of the Downs, an area now overgrown and inaccessible. Ashes flower before the leaves come out, the dark black winter buds producing a mass of purple catkins, some of which are male and some female. The average first flowering date is Mar 27, (range 44 days, the earliest Mar 11 and the latest Apr 24) and lasts for five weeks on average. The leaves come out three weeks later, on Apr 19 (range 24 days, earliest Apr 9, latest May 3), later than most other species. The leaves are opposite and up to 35 cm long with up to 13 leaflets, and always with a terminal leaflet. Some years fruit production is massive, and the green ash keys, which ripen to brown, can clothe the whole tree through the winter. The seeds are about 4cm long, and start to turn brown on average by Aug 15 (range 68 days, between Jul 9 and Sep 15). The seeds are normally blown off by winter storms, but can remain on the tree for the whole of the following year. Green seeds will germinate at once, but seeds that have turned brown will remain dormant for 18 months. Millions of seedlings germinate every year. The leaves start to fall from Sep 29 (range 48 days, from Aug 30 to Oct 17) and they are bare by Oct 29 (range 39 days, Oct 2 to Nov 10). In some years there is little colour change, but in others they turn a brilliant yellow. On average they have one of the shortest active lives, a consequence of their late start, at 194 days, but the range of this is 62 days, from 168 to 230 days. The timber is strong, and used for tool handles. It also burns very well, even when freshly cut. They may in future suffer from Ash Die Back disease*, Chalara fraxinia*, a fungus that has spread from Europe where it has caused much damage. Research suggests that English Ash may have greater immunity than in Denmark and the disease kills slowly, so that it is unclear how great its impact will be. Moment of Glory, October in a dry autumn when it turns gold.

**4 Narrow-leaved Ash, *Fraxinus angustifolia*.** This species comes from **s**outhern Europe, and was introduced to Britain around 1800. There is one young close to Ladies Mile at ST5667 7447 which lost a major bough in 2017. This species has been quite widely planted in parks in recent years, and it has the most dramatic autumn colour, turning from green to pink and purple and red. It has very finely divided leaves, and its flowers and fruit are similar to the native Ash, but not often produced. In winter the light brown buds enable it to be distinguished from the Common Ash. Moment of Glory, mid-October.

**5 Manna Ash, *Fraxinus Ornus*.** This species is native to southern Europe, and wasintroduced in 17th century. This is an uncommon species whose leaves only have seven leaflets. The flowers are very conspicuous, fragrant, white panicles, that appear in late May after the leaves have developed. They attract many pollinators There are four young trees in a row at the end of the Pound approximately ST5685 7427. They are infested with Ivy at present. It is effectively impossible to distinguish from all the other ash trees except when it is in flower. It does produce clusters of ash keys that ripen from green to brown, but do not seem to germinate. Moment of Glory, late May.

**6 Bay Tree. *Laurus nobilis.*** This is a Mediterranean tree, first recorded in Britain in 1562, but also probably brought here by the Romans. Its evergreen untoothed leaves, sometimes with undulated margins, are widely used for flavouring stews. They are about 10cm long and 4 broad. It is happy to be clipped, and its black bitter fruit is enjoyed by Woodpigeons. It rarely grows into a large tree, but suckers copiously so that the size of its clump is a guide to its age. It is not fully hardy, and is readily damaged by extended frosts. However, seeds will germinate readily and it has been found in 5% of hectare squares. Trees are either male or female. There are two very large trees, both close to the Suspension Bridge. One is at ST5661 7320, the other at ST5659 7309. Its flowers open on May 9 (range 48 days, between Mar 8 and May 5) and last five weeks. The fruit is a small black berry, which ripens from green to black on Oct 3 (range 52 days, between Aug 31 and Oct 22). They last on the tree for about ten weeks, until the end of November.

**7 Beech. *Fagus sylvatica***. Native. Present in 45 % of the region, and 36% of hectare squares on the Downs. Biodiversity value, high. Beech has been very widely planted, but also readily regenerates from seed. The national champion has a girth of 850cm. The largest in Bristol is in Eastville Park with a girth of 520cm. On the Downs the grandest are the six trees in a semicircle off Saville Road that helped define the Gloucester County cricket ground in the 1860s. The largest, at ST5680 7522, has a girth of 480cm. There is a fine pollard near the Water tower at ST5727 7495 also with a 480cm girth. The finest avenue is along the Promenade, though the girths vary greatly. The trees at the top of the slope have only relatively recently become established. A tree that came down in 2017 proved to be just over 60 years old, planted perhaps in 1950. There is an account of their being 15 bomb craters on the triangular plot of land round Proctors Fountain, and some of the trees there must have been planted after the last war. There has been an avenue here since 1826 but it is not known what species the previous avenue was. Another Beech avenue has been planted along former toll road leading to Stoke Hill as a replacement for the Huntingdon Elms that died in 1976. At present these trees are still small, but they will in time become a dominant feature of the Downs in Autumn. Young self-sown Beeches can be found readily but they are very light demanding, and only two were found on the survey of the gorge cliff face.

Beeches come into leaf quite abruptly on average on Apr 10, (range 26 days, the earliest Mar 29, latest Apr 25), and the whole growth of the tree for the year occurs in the next two weeks as the shoots expand. The leaves cast a very heavy shade, and few species can survive beneath them. The catkins, which are fluffy green balls, descend about ten days after the leaves appear, average date Apr 19(range 26 days between Apr 9 and May 5) and last for about three weeks before dropping and covering the ground. Some years there are no flowers at all, and hence no nuts. The nuts ripen on Aug 28 (range 47 days between Aug 6 and Sep 22) but very often squirrels attack and eat them before they are fully ripe. Ripe nuts fall through September and into October. The size of the harvest varies enormously from year to year, and from tree to tree, and fallen nuts remain edible right through the winter. The very distinctive seedlings, with two large circular seed leaves, appear in mid-April. The nuts are an important food source for a wide variety of bird and mammal species. Their leaves start to fall on Sep 18 (range53 days, between Aug 16 and Oct 8) and are usually fully turned to a wonderful brown by Oct 22(range 47 days, between Sep 27 and Nov 13) and are bare by November 5th, (range 54 days between Oc4 and Nov 26). Their active year is about 210 days, with a range between 183 and 237 days. Their bark is smooth and silvery grey, and attracts graffiti cut into it. Unlike almost any other tree the bark is elastic, and does not furrow to take up the annual growth. One interesting result is that on young trees Lichens, that normally expand their whole circumference by a millimetre or so a year are distorted into an oval shape by the speed of growth of the bark. Young trees retain their brown leaves throughout the winter. Moment of Glory, late October.

**8 Copper Beech *Fagus sylvatica purpurea*** The red-leaved form of the Common Beech is a fairly common natural sport, and was a great favourite of the Victorians. In winter its saplings are indistinguishable from the normal form and it is sometimes planted in accidentally. The largest tree in Bristol is the one in the forecourt of the Merchant Venturers house overlooking the triangle of land by Proctors Fountain with a girth of 540sm. Close by at ST5659 7373 there is another fine tree with a girth of 420cm. Almost all the others on the Downs are young trees planted in the 1970s, except for on in the Westbury Park area at ST5730 7591 with a girth of three metres. It occurs in 11% of the Down’s hectares, and there are at least 33 individuals on the Downs.

**9 Erman’s Birch** ***Betula ermanii*.** This species is a native of Japan and was first brought here by 1890. It is a rare tree, normally only found in collections. There are three fine trees planted at the top of Stoke Hill at ST5668 7520. They have a girth of 220 cm, and one was blown down in 2018, and 75 rings were counted. Young trees are strikingly white but these ones have become rugged with age. Their bark peels off in horizontal strips. Their form of growth is strongly upright, and a marked contrast with the usually pendulous form of the Silver Birch. Moment of Glory November to March when they are craggily magnificent.

**10 Silver Birch *Betula pendula***Native. The national champion has a girth of 390cm. The largest in Bristol is a twin trunked tree at the Sneyd Park Nature Reserve with a girth of 300cm. The largest measured on the Downs is by the Café at ST5709 7488 with a girth of 290, making it a little over a century old. It is found in 23% of the region and 33% of Downs hectare squares. Biodiversity value high. It is a pioneer species that is light demanding, but itself casts very little shade. Its leaves appear on Mar 30 (range 37 days, between Mar 15 and Apr 21) and the catkins elongate on Apr 6 (range 29, Mar 23 to Apr 21). The male catkins hang below the leaves, but the female ones are held upright. Once pollinated they swell and hang down, and mimic the appearance of the male catkins. The seeds ripen rapidly on Aug 3 (range 44 days July 13 to Aug 26). Some trees ripen all at once, filling the gutters with the tiny winged seeds, and the casing holding them, others keep their seeds on through the winter, and only losing them in gales. Goldfinches and in late winter Siskins enjoy feeding on them. Leaves start falling early, especially if it is dry, the average date is Aug 28. But in a good autumn they turn a marvellous gold colour, and this is usually complete by Oct 8 (range 55 days between Sep 9 and Nov3. They are usually bare on Oct 28th but this too has a huge range of 56 days between Oct 5 and Nov 30. The Fly Agaric fungus, which has a dramatic red surface flecked with white blobs, is closely associated, and there is a patch that appears every October near Proctor’s Fountain. Almost 500 species of insect are associated in one way or another with the tree. Moment of Glory, early October.

**11 Buddleia *Buddleia davidii.***  This is a Chinese tree that was first discovered by the great plant collector Armand David. It entered commerce in 1890. It is more of a straggling bush than a tree, with a strongly arching tendency. Buddleia is present in 5% of the hectare squares on the Downs. Mostly it is a component of scrub clumps, but occasionally forms a distinctive feature as close to Ladies Mile at ST5661 7434. It is an evergreen shrub, and has cones of purple flowers from July to September, lasting for eleven weeks, which attract many pollinators, and then ripen to black cones with tiny seeds that are scattered to the wind. In germinates rapidly and plants will rapidly cover bare ground in a very short time. It was a significant feature of the shrub layer in the Gully, but has been eaten back by the goats. Moment of Glory, August.

**12 Deodar Cedar. *Cedrus deodora***. Native to Afghanistan, this species reached Britain in 1831. It grows fast and well in our climate, and was widely planted by the Victorians. However, after about a century they tend to die, and many of the large gardens along the Promenade have lost them in recent years. It is readily distinguished from the other cedars, to which it is closely related, by the fact that the leading shoots all droop downwards. The male catkins appear in October, and coat the ground around when they fall. The single Downs specimen is a young tree has been planted on the triangle of land near Proctor’s Fountain at ST5664 7380, which is growing well.

13  **Horse Chestnut.** *Aesculus hippocastanum*. Native to Albania, the Horse Chestnut has been planted in England since 1616. It is found in 71% of the Downs hectare squares, as it forms the major component of several avenues. The largest in Bristol is in York Place, Clifton with a girth of 625cm, very close to the national champion that has a girth of 660cm. The largest on the Downs is on Saville Road at ST5713 7576 510cm. Its name may derive from the horseshoe-shaped scars left by its leaves on the shoots when they fall. The conkers it produces have a variety of chemicals in them including saponids, which can be used to create a form of soap. In the winter some of the puddles on the Downs roads are turned into a white froth as the conkers are crushed by cars. It is very commonly planted in parks, and forms the avenue along Savile Road and Westbury Park. These trees are some 140 years old, and are successively dying. Its winter buds are covered in resin, whence the name sticky buds, and are among the first to come into leaf, usually around Mar 10 (range 54 days, Earliest Feb 7, latest Apr 2). One near the white tree roundabout at ST5729 7582 always comes into leaf and flower some two weeks earlier than all the others.

 The leaves are large, with five to seven leaflets, and the whole leaf can be 60cm across. The white candles appear on Apr 15 (range 47 days, earliest Mar 20, latest May 7) and last about six weeks. They are up to 30cm tall, and each has up to 50 flowers. However, it is unusual for more than five conkers to form on each candle. The circular spiked conkers develop fairly rapidly and fall from Sep 12 (range 30 days, earliest Aug30, latest Sep 29) and they last on the trees for a month. They are a very beautiful glossy brown, with a white scar on one edge, up to four cm across, and much sought by young boys. The seeds will germinate readily, but are very light demanding and very rarely make it into the canopy, though there are a few examples of self-sown trees on the Gorge slopes.

In the Autumn the trees turn brown quite early. Leaves fall from Sep 16 (range 48 days from Aug 21 to Oct 8) and they are fully turned by Sep 29 (range 45 days Sep 6 to Oct 22). They are bare by Nov 6th (range 51 days, Oct 15 to Dec 5) and have a growing season of 238 days (range 70 days from 203 to 273).

Since 2002 a new pest, the Chestnut Leaf Miner Moth, has invaded. This micro-moth was first identified in Albania in 1984, and lays eggs in the young leaves and the grubs eat out the centre of the leaf, pupate, and emerge, and this process can be repeated three times in a good summer. As a result the leaves become covered in brown blotches, and make the tree look as if it is dying. The final generation of grubs pupate and overwinter in the leaf litter to emerge in the early spring. There is no evidence that this actually harms the tree, but it makes it very unsightly and when trees die they are now being replaced by Indian Horse Chestnuts. Many older trees also suffer from bleeding canker. Moment of Glory, early May.

**14 Red Horse Chestnut.** *Aesculus x carnea*. This is a hybrid between the Horse Chestnut and the Red Buckeye, which is an American tree. It came from Europe before 1818. It grows slowly, is not long-lived and has a poor crown. Its leaves are smaller and darker than the Horse Chestnut, but it is not affected by the miner moth. Its flowers are a rather muddy red, and not as abundant as the Horse Chestnut. There are some 20 trees planted as part of the Westbury Road avenue, and they are found in 10% of the Downs squares. It does not occur anywhere else. Most of the trees have a girth of between 100 and 150cm, and some look sickly. Its fruit are smaller than the Horse Chestnut, not so prickly, and have very inferior seeds.

**15 Indian Horse Chestnut.**  *Aesculus indica* This species comes from the Himalayasand reached Britain in 1851. It is an uncommon tree, planted at three other sites in Bristol, and set to become far more familiar in future as it is not affected by the Leaf-miner Moth. Its buds are resinous like the Horse Chestnut but the leaves unfold a bright orange, before becoming green, and are distinguished from Horse Chestnut leaves by their narrowness, and the fact that each leaflet is stalked. They come into flower in June, just as the Horse Chestnut flowers are fading. The fruit are smooth and leathery, and the conkers within are smaller and blackish brown. On the Downs several have been planted close to the Whitetree roundabout as replacements for Horse Chestnuts.

**16 Himalayan Tree Cotoneaster. *Cotoneaster frigidus.*** This species reached Britain in 1824 and was quite a Victorian favourite. It tends to become multi trunked over time, and never grows very tall. It has fine panicles of white flowers in the spring, and bright red berries in the winter, which tend to stay on the tree until quite late in the season, when the Redwings devour them. Seedlings occasionally grow, and it was found at just two sites; It is part of the scrub on the Tumps at ST570746. There used to be a prominent one close to the lip of the Gorge by the Observatory, but this was removed probably because it was an alien species that it was feared might spread.

**17 Dogwood. *Cornus sanguinea.*** Native, found in 42% of the Downs squares and 68% of the regions monads. . Generally speaking this grows as a shrub, but, given the opportunity, it can become a small tree. It usually comes into leaf on Apr 2 (Range 36 days between Mar 21 to Apr 27). It has white flowers help upright in a disc, and they appear on May 20 (range 39 days between May 7 and Jun 16). They last for four weeks. There is often a second flowering, which occurred in 2008, 09, 11, 14, 15. The average starting date was Sep 24 (range 61 days between Aug14 and Oct 14) and the average finishing date was Nov 16 (range 71 days, between Oct 25 and Jan 4). The average duration of this flowering was longer than the first flowering, at 71 days, with a range of 55 days between a minimum of 27 days in 2008 to a maximum of 82 in 2014. This second flowering does not lead to any fruit, presumably because there are too few pollinators around.

The small green berries turn black by Aug 23 (Range 21 days between Aug 13 and Sep 3). They remain on the tree for around ten weeks until the start of November. They are eaten rapidly by warblers and other small birds. The leaves start to turn colour on Sep 30 (Range 50 days, from Aug 22 to Oct 11). Their colours are dark greens, purples and reds, and can be very striking. It is a shrub that spreads readily both from seed and mainly by suckering, and it can rapidly cover a large area. Non-native varieties are often grown in parks and gardens for the winter bark colouration, but it is only the previous year’s shoots that show a colour and in the native species they are a dark red. Some were put on the Zoo North carpark, which is part of the Downs, during a little landscaping a few years back. Moments of Glory, late May and October.

**18 Elder. *Sambucus nigra.*** Native. Found in 46% of the hectare squares on the Downs. In the region it is found in 96% of monads, almost the most widely distributed plant. It is usually multi trunked, though there is a bush with a trunk with a girth of 225 cm in a private road in Clifton. Biodiversity value, high. It is the fifth commonest tree on the Downs, and a regular component of the clumps on the Downs surface often intertwined with hawthorn and Holly, and some of the trees are very large. It rarely makes a strong tree, as it commonly makes new shoots form the base, and becomes more of a sprawling shrub. New shoots are initially hollow, and large trunks are exceptional. It regenerates readily if cut back. Wine and soft drinks are made both from the flowers and the berries. It has the longest growing period of all the deciduous species, as it very often still has old leaves hanging on when the winter buds, which have no protective covering, begin to shoot to make new leaves. The average date of bud-break is Jan 16, an average which includes five years in twenty when bud break happened before Jan 1. The period from Bud break to flowering is exceptionally long. The opposite leaves are pinnate with usually seven leaflets and up to 30 cm long. The average flowering date is May 13 but the range is 41 days, between Apr 22 and Jun 2 (in 2013). The white flowers are up to 30cm across and held upright. The flowering period is on average ten weeks, and the flowers are pollinated by flies. The berries are initially green, and ripen to black on Aug 6, range 38 days, between Jul 20 and Aug 27. They are rapidly consumed by thrushes, and normally last for 11 weeks, all being gone by the end of October. The seedlings readily germinate. The leaves do not change colour but fall slowly, and trees are on average bare by Nov 24 (range 79 days, between as early as Oct 4 and as late as Dec 22). It has the longest growing period of all, an average of 314 days, which can be as long as a full year or as short as 252 days. It is particularly associated with the Jelly Ear fungus. Moment of Glory, May.

**19 Common Elm. *Ulmus procera*.** Native. Found in 35% of the Downs Hectare squares and 73% of the regions one-km squares in the Flora 2000. Distinguishing Common and Wych Elms is difficult when they are young, but both are now widespread, as they were before 1976. Common Elms are usually clones, and spread by suckering, so that they had little resistance to the outbreak of Dutch Elm Disease in 1976, the hottest summer Bristol has had since 1853, and one of the driest. The disease is a fungus carried by a beetle, whose population exploded that year, and the drought helped to weaken the trees. The trees reacted by sending up millions of suckers from the roots. These were attacked by the disease fifteen years later in the 1990s, but many survived and are now in the canopy in several areas, and also form a very dense coppice round an old Ash tree near Ladies Mile at ST5666 7426. Tall trees can be found near the top of the Gully at ST5635 7449. The disease continues to kill a few trees every year. Elm suckers often come into leaf very early on average Mar 7 (range 46 days from Feb 15 to Apr 2). In the autumn Elms turn a magnificent yellow, on average on Oct 7(range 81 days between Aug 26 and Nov 15). They tend to be very affected by drought, which has on occasion caused a very early onset of autumn colour. They are bare by Nov 2, but this also has a huge range of 70 days between Oct 2 to Dec 11. Their normal growing season is 241 days, with a range between 210 and 280 days, which is a 30% difference. There are some 50 moth species associated with the tree. Moment of Glory October.

**20 Wych Elm.** ***Ulmus glabra*.** Native. Present in 18% of the Downs Hectare Squares and 51% of the regions one-Km squares in the flora 2000. Biodiversity value High. Until 1976 a cultivar of the wild Wych Elm, called the Huntingdon Elm, formed the main avenue up Ladies Mile and along the old toll road to Stoke Hill, and around Upper Belgrave Road. Many died at once, others lingered, and at the time of writing 2017, one is left at ST5657 7418, close to the junction of Circular Road and Fountains Hill. There is also one survivor close to the Water Tower. It is a much younger tree at ST5725 7498. Wych Elms readily regenerate from seed, and there are a large number of saplings growing up around the Downs. The fat flower buds open on average on Mar 2, (range 53 days, between Feb 8 and Apr 2) well before the leaf buds break, turn the whole tree purple. They last for on average six weeks, and then turn green as they ripen, making it appear that the tree is in leaf. Elm saplings come into leaf on Mar 8 but can be as early as Feb 15, and as late as Apr 2, a range of 46 days. On adult trees the leaves appear in mid-April. The seeds ripen to brown and fall in great drifts at the end of May, ready to germinate rapidly if conditions are appropriate. In the autumn the trees will turn a brilliant yellow if conditions are right. Their progress in autumn is the same as that of the Common Elm. Leaves start to fall on average on Sep 28 (range 81 days, Aug13 to Nov 2). They are usually fully turned on Oct 7 (range 81 days, Aug 26 to Nov 15) and bare by Nov 2 (range 70 days, Oct 2 to Dec 11). The active year is on average 241 days, with a range of 70 between 210 and 280. The largest in the city, girth 250 cm, is in Castle Park and was apparently planted in 1970, just before the disease struck. There are also survivor specimens in Blaise and Badocks Wood. There are thousands of seedling trees that are forty years old and in the canopy. Moment of Glory early-March and early October.

**21 Resistant Elm. *Ulmus Sapporo autumn gold****.* This is a hybrid Elm, a cross between a Siberian Elm and a Japanese Elm, which took place by chance in 1958 at the Botanical garden of the Hokkaido University at Sapporo. It was cultivated in the university of Wisconsin, and proved to be very resistant to Dutch Elm Disease. Five trees were planted on Clifton Green after the Common Elms had been killed by DED in 1975. Only one of them has survived intact It can be found at ST5682 7329. They tend to fork at about two metres, and the other four had catastrophic failures in storms. One was replaced by a young tree in 2015. Two of the others were pollarded at two metres and have developed a strong bushy top. One has been planted on the edge of North view at ST5728 7569 It does not look as if this is a suitable replacement for the English Elm.

**22 Garrya**. *Garrya elliptica.*  This is a single specimen of a garden species planted on the lip of the Gorge close to the Observatory at ST5653 7324. It is evergreen, and native to the Californian coast. Trees are either male or female, and the male tree carries catkins that elongate attractively in January. Recent clearances of alien shrubs from the gorge face have tried to cut it back, but it is still quite vigorous. As there are no female trees in the area it is a fairly harmless species.

**23 Hawthorn. *Crategus monogyna.*** Native. Recorded in 97 % of the regions one-km squares in Flora 2000, and found in 69% of Downs hectare squares. Biodiversity value very high. Hawthorns are the commonest species on the Downs, and may well be the oldest. A century ago the Downs were famous for their Hawthorns and they were a major tourist attraction when in flower. Hawthorns are naturally very slow growing, and become slower with age. They also naturally send up shoots from their rootstock, and are often multi trunked as a result. A normal tree species with a girth of a metre will usually be 25 years old but a Hawthorn will be 100. There are a number of veteran rugged multi trunk Hawthorns on the downs, whose girth cannot be measured, but that are growing at a rate of just 3 millimetres a year. Normally sheep grazing will ensure that Hawthorn seedlings never survive, unless they are protected, and it is my belief that some at least of the veterans on the Downs date back to the English civil war in 1640, a time which normal agricultural activity ceased, and the Downs were twice occupied by a besieging army. In the past fifty years many of these ancient thorns have become invaded by Nettles, Brambles, Ivy, Dog Rose, Old Mans Beard, Elder, Holly and Yew, and have become the centre of a large number of clumps that have been rapidly merging. Many of the Hawthorns have been blown down by Ivy getting into their tops, with a mass of heavy ripe berries, and the Hawthorn itself has toppled over. There is a glade of fine tall veterans near the Yew tree at ST5639 7447, and quite close to the eastern end of Bakers path there are two very fine specimens at ST5687 7450 and ST5683 7451. There are two thorns with twisted trunks. One is just outside the Ranger’s Pound at ST5690 7432 and the other is a little north of North View Road by the Whitetree Roundabout at ST5733 7583.

They come into leaf on the Downs later than in hedges closer to sea level, at an average date of Mar 10, Range 46 days, the earliest Feb 10 in 2004, the latest Apr 2 in 2006. Their brilliant white flowers appear on Apr 25(range 49 days the earliest Apr 5 in 2002, the latest May 24 in 2014) They remain in flower for six weeks. The green berries steadily enlarge and turn red on Aug 17 (range 40 days between Jul 25 and Sep 3.) They are eaten by thrushes, especially redwings, but are very abundant almost every year, and last on the trees on average for 22 weeks into early March. Hawthorns don’t turn colour in the autumn in a significant way, and lose their leaves by stealth. They are bare by Oct 18 (range 4o days between Sep 29 and Nov 7). Their active year is 222 days long, but can be as little as 205 and as much as 288. The species readily regenerates, and is a significant part of the scrub layer in the Gully. There are some 50 moth species that use the Hawthorn. Moments of Glory, early May and early September.

**24 Common Hawthorn. *Crategus* *monogyna Stricta.*** This is a cultivated form of the Common Hawthorn that has a strongly vertical growth form.There are a number of young trees planted perhaps 40 years ago, most of them in the Westbury Park area of the Downs. They have an upright form of growth which is dramatic, but they rarely carry as dense a mass of flowers.

**25 Midland Hawthorn, Paul’s Scarlet. *Crategus Oxyacanthoides*.** The Midland Hawthorn is a native species, but rare in the South. In 1838 a double variety that was deep pink was created, and has been a popular tree ever since. Being a double flower it is sterile, so that all such trees have to be grafted on to Common Hawthorn rootstock. Some 40 years ago a large number of Paul’s Scarlet trees were planted across the Downs, possibly as potential replacements for the native ones that were failing. Many of these survive, but in many cases shoots have been sent up from the rootstock, and in some cases over-power the Pauls Scarlet shoot and there are many examples of both red and white flowers on what appears to be the same tree.

**26 Broad-leaved Cockspur Thorn.** ***Crategus x prunifolia.*** A north American hybrid which is widely planted. It has glossy dark leaves and big flowers, and dark red berries. A single bird sown individual can be found close to Ladies Mile at ST5682 7465. It has fare fewer thorns than the Cockspur Thorn

**27 Hazel. *Corylus avellane*** Native. Biodiversitty value, high. It was recorded in 80% of the regions one-km squares in the Flora 2000 and in 35% of the hectare squares on the Downs. It is a very successful bushy tree that self-coppices, producing new shoots from the base regularly. This has the result that it is impossible to age because the tree always forms a multi-trunked clump. Its catkins are the very first sign of spring every year, and appear on average on Jan 17. In just two years 2007 and 2016, they appeared before New Year’s Day. The range is 43 days, because the latest date was Jan 31 in 2010. The catkins last on the trees for an average of 11 weeks. It can be a long time before the leaf buds break, the average date for which is Mar 25 (range 49 dates between Feb 28 and Apr 17). The leaves are rounded and softly hairy. Individual trees vary considerably on the date they leaf. The cob nuts ripen though the summer, but the squirrels get to them before they are fully ripe, and as a result I have no accurate figure for their ripening. The average date when evidence of squirrel attacks are seen is Jul 19. This may have the result that there is probably now less regeneration than there used to be, though young Hazel remains a dominant species on the face of the Gorge. The leaves drop while still green, but the tree slowly turns yellow, and becomes bare by Nov 27 (range 47 days, from as early as Nov 2 to as late as Dec 19.) The effective year length is 252 days, but because of the large range in the bud break dates this can be as little as 229 and as many as 315. It would be much longer if the date of flowering were taken as the start. Moment of Glory late January.

**28 Holly. *Ilex aquifolium.*** Native. Biodiversity value high. Recorded in 68% of the regions one-km square sin the Flora 2000 and in 55% of Downs hectare squares. The national champion has a five-metre girth, and the largest measured in Bristol is in Stoke park with a girth of 300cm. It is a common evergreen species that regenerates very easily. It is particularly common as a part of the development of clumps on the surface of the Downs often associated with Hawthorns. Trees are either male of female They are tough, readily shoot back if cut down. When given enough light it can become a full-size tree, and there are several good examples on the Downs surface. But it also shoots from the base of the trunk, and forms multi-trunked clumps and its tolerance of shade has the result that it is a very common feature of the shrub layer. There is a multi-trunk tree close to Proctors Fountain at ST5662 7383. which is notably tall. The largest trunk has a girth of about 160cm. The leaves live for about five years, and fall in July. They are waxy and shiny and the lower leaves are spiny. They are often attacked by a leaf miner fly. The flowers appear on Apr 26 (range 36 days, between Apr 6 and May 12). They last for six weeks. In ten years of observation Holly has come into flower for a second time in the Autumn on eight occasions, usually in October, and stayed in flower for an average of eight weeks. In the exceptionally warm December 2015 Holly was in flower from Oct 16 to Jan 24. Green berries are rapidly formed and ripen by Sep 10 (range 54 days, the earliest Aug 8, the latest Oct 1). They start being eaten in December, and but on occasion ripe berries remain right through the winter, sometimes on one particular tree. There is a natural sport that produces yellow berries, and there is an example near Fountains Hill at ST5645 7407. They are an abundant and important food source for birds, and the speed with which they are eaten probably has more to do with the size of the population eating them than the quality of the berries. On one occasion, by the Suspension Bridge, new flowers in April could be seen alongside ripe fruit. Moment of Glory, late September.

**29 Hornbeam. *Carpinus betulus*.** Native. Fund in 8% of the regions one-km squares and in 10% of Downs hectare squares. Biodiversity rating High. The national champion has a girth of 550cm and the largest measured in Bristol is in Eastville Park with a girth of 325cm. On the Downs there are one or two fine trees that have obviously been planted, and a number that are self-sown, and in some areas of the Gully it is regenerating happily. It is a common woodland tree in the south east of England, but it is uncommon in the west. On Clifton Green there are two prominent trees by Christchurch at ST5698 7332. There is one that is part of the Beech avenue on the Promenade that was probably planted in error at ST5658 7380, and is the largest on the Downs with a girth of 240cm and there are two fine trees on the edge of Westbury Road at ST5732 7521.

They have leaves that are similar in size to Beech, but they are alternate, with serrated edges, and prominent veins that give a corrugated effect. They come into leaf on Mar 27 (range 31 days, between Mar 14 and Apr 14) and like Beech their rather inconspicuous catkins appear with the leaves. Their fruit are small 8mm nuts hanging in a bunch below the leaves, each attached to a three-pronged sail to help dispersal. They are often attacked by the squirrels, and it is not easy to tell when they are ripe. Their leaves start to fall on Sep 8, range 81 days, and they are bare by Nov 6 (range 30 days, Oct 25 to Nov 24) Their leaves do not turn colour in a dramatic way. Young and clipped trees will hold their leaves through the winter. The tree is host to a wide variety of insect species.

**30 Common Laburnum. *Laburnum anagyroides.***  This is native to S Europe, and has been grown in gardens since 1560. It grows fast initially, but is short lived and rarely grows to any size. Its fruit, small black seeds, are poisonous, as are the leaves. It is surprising to find it growing in a public park. A number were planted in the Westbury Park area probably just after the last war, and it has been found in seven hectare squares. Many have suffered from storms, some have put up new shoots from the base. Its leaves are trefoils, and its pea like flowers hang in long racemes. They open on May 3 (range 40 days, between Apr 16 in 2011 and May 26 in 2013). The fruit are held in a pod that turns brown and twists, and can break open to scatter the seeds explosively. Moment of Glory, early May.

**31 Common Lime. *Tilia x europea*.** Native. Biodiversity value high. Found in 17% of the regions squares, it is present in 34% of Downs hectares This is a natural cross between the Small-leaved and Large-leaved Limes, both native species. The national champion has a girth of 930cm and the largest in Bristol is in Kings Weston with a 500cm girth. On the Downs the largest has a girth of 410cm, and is part of the Westbury Road avenue at ST5725 7565. There some 125 trees that form the whole or part of eight avenues on the Downs, including the Zoo avenue, and both Stoke Road, Ladies Mile and Westbury Road avenues. On both Stoke Road and Westbury Road they are interplanted on an irregular basis with Horse Chestnuts and Red Chestnuts. As Limes grow more slowly that most other species the presence of a veteran Common Lime in an avenue of younger trees is a strong indication that it may well have formed the avenue in earlier times. It is striking that the limes around Clifton College were planted in 1862, and a photo of them exists in the College archives, and many of the Common Lime trees on the Downs have trees of the same girth.

The hybrid regenerates very readily from cuttings and became the normal tree used for avenues and in parks from the 17th century, because of its wonderfully scented flowers in June, and its willingness to be pruned into all manner of interesting shapes. It has two drawbacks in the modern world; it tends to make masses of epicormic growth from the bottom of the trunk that needs annual removal, and it is infested with an aphid species whose excretions cover cars in a sticky gunk that is not readily removed. The oldest in Bristol are those lining the main drive to Kings Weston House which are 250 years old. There are some 30 veteran trees on the Downs that are more than 150 years old, ie with girths of more than 300cm, There is also a huge unmeasurable tree on the lip of the Gully, just inside the Goat enclosure, whose epicormic shoots completely surround it. At least two of the trees on the Old Toll Road avenue have layered their branches, and are forming a Common Lime clump. Limes come into leaf on average on Apr 9 (range 33 days, between Mar 25 and Apr 27), but they don’t flower until Jun 23 (range 28 days, between Jun 11 and Jul 9), one of the very last trees in flower. They are strongly scented and very attractive to bees. The flowers last for three weeks, and then form small nuts hanging below the leaves on stems called pedicels. Limes are among the first trees to start losing their leaves, on average on Aug 31, (range 61days between Aug 8 and Oct 8.) The leaves often fall while still green, and their colour is never dramatic. They become bare on average on Oct 26, with a tiny range of 17 days between Oct 21 and Nov 7. Their seeds stay hanging on the tree through the winter, but very few germinate, as most summers are not hot enough to ripen them. Sapling limes are quite uncommon, but there can be large numbers of them after a hot summer. They normally have an active year of 202 days (range 44 days, between 183 and 227 days). Moment of Glory, late June.

**32 Large-leaf Lime. *Tilia platyphyllos***. Native. Biodiversity value high. A very rare tree in the wild, recorded in only seven one-km squares in the Flora 2000. On the Downs it is found in 30% of the hectare squares, because it was widely planted along with the Small-leafed Lime after DED. It can be readily distinguished in June when in flower, as its flowers hang down. Its large leaves are soft and hairy above, that are often dished, whereas common lime leaves have no hairs. It is now widely planted as its aphids are not a problem. It is clear that it was planted in the past as an alternative to the Common Lime, and there is an avenue of this species on the walk through the Westbury Park area. The largest, at ST5735 7540, has a girth of 480cm, and must be at least two hundred years old, and is the largest specimen in Bristol. The national Champion has a girth of seven metres. They are the first lime to come into flower, usually around Jun 21 (range 31days, earliest Jun 5, latest Jul 6) usually with three or four hanging flowers and the seeds are five ribbed and covered in hairs, with a very large bracts nine cm long which start a very pale green but ripen to a deep brown, often looking like dead leaves after the real leaves have fallen. The seeds do not appear to germinate. Like all the limes they start losing their leaves early and are bare by late October.

**33 Small-leafed lime. *Tilia cordata*.** Native. Biodiversity value high. They were found in only 5% of squares in the flora 2000, but were the main species chosen to replace the Elms on the Downs killed by DED in the 1970s, and are present in 37% of Downs hectares. They now form some 30% of the 900 trees that form the avenues on the Downs. In particular they are planted round Circular Road, along Downleaze, along Ladies Mile and Upper Belgrave Road. About 30 were planted in 2016 to fill in gaps. The national champion has a girth of 790cm; the largest in Bristol is in the Blaise estate with a girth of 400cm. On the Downs the largest is self-sown in the Gully, with a girth of 270cm, whose branches are layering. The largest planted specimen on the Downs has a girth of 250cm on Upper Belgrave Road, and was probably planted in the 1960s before DED. One, which is certainly post DED is 240cm, close to Proctor’s Fountain.. There are some huge ancient pollards in Leigh Woods. It is now invariably planted rather than Common Lime, as it normally does not have the epicormic shoots of the Common Lime, and the aphid species on its leaves do not exude sticky gunk. It is more delicate tree, with small heart-shaped leaves, which have orange tufts of hair on the underside but the key feature to identification is that its flowers are held upwards above the leaves rather than hanging down. There are around five to ten flowers in a bunch. When they come into flower at the end of June the effect is that the whole tree has changed colour to a yellowish green. The seeds are small and round with no ribbing and do not usually ripen as our summers are too cool, but, after a hot summer, saplings can be found, and it is a species that will benefit from a warmer climate. They have grown very fast and well in the past forty years. Their leaves fall in September and they are usually bare by Nov 1 (range 36days), and they have a growing season of 202 days (range 84 days, between 168 and 252 days.) Moment of Glory, late June.

**34 Silver Lime. *Tilia tomentosa***. SE Europe Introduced 1767. This is a vigorous lime, a number of which have been planted along Ladies Mile. They have rather large dense leaves that have dense white hairs on the underside. They flower later than the other limes at the end of July, and tend to hold their leaves longer. They also turn a deep yellow, and the contrast with the silver underside is dramatic.

**35 Sycamore. *Acer pseudoplatanus.*** It seems probable that it was introduced to this country before 1500, as its heartland is central Europe, but it is very comfortable in our climate. Nationally it is present in 90% of the hectads in the UK, a wider distribution than that of any other tree species. On the Downs it is found in 44% of hectare squares. Biodiversity rating high. The national champion has a girth of 825cm. The largest in Bristol is in the Blaise estate with a girth of 620cm. The largest on the Downs has a girth of 340cm, and is close to the Children’s playground, and may have been part of an avenue along the path. It is the sixth commonest species on the Downs, but only present in two of the avenues, and there it is the variegated form. It produces millions of seedlings every year, and on the Downs is common on the fortifications of Clifton Camp, the edge of the Gorge, and saplings can be found almost anywhere. The finest tree is a double trunk tree at the top of bridge Valley Road, at ST5655 7391 which dominates the complex junction there. Each of the two trunks has a girth of 200cm suggesting an age of about 80 years. An older tree with a single trunk grows near the Whitetree roundabout at ST5734 7588. It has a girth of 320 suggesting it is 120 years old. Saplings are very fast growing, and regenerate vigorously if cut back creating a variety of multi-trunked trees. A distinctive feature is the way that on older trees the bark is constantly shed in small platelets, rather like the Plane tree. This is clearly different from the Norway Maple whose bark is always vertically furrowed. The leaves, as in all maples, are opposite and have the typical five-pointed star shape, but the points are blunt compared with the sharply pointed tips to the leaves of the Norway Maple with which it is readily confused. Another difference in winter is that the Sycamore buds are always green, whereas the Norway Maple has reddish buds. Young trees come into leaf well before mature ones, on Mar 10 (range 54 days, the earliest Feb 14, the latest Apr 9). The hanging panicles of flowers, which can be 20cm long on mature trees do not open until Apr 17 (range 30 days, between Apr 5 and May 5), 38 days later. They are very rich in nectar and pollen, and in most years a very high proportion are pollinated. They last on average for seven weeks. The seeds are paired, and at right angles to one another with a wing which enables them to spin long distances when shed in the autumn. They develop over the summer and are usually ripe on Sep 26 (range 40 days, Aug 29 to Oct 17). They usually last on the tree for eight weeks, but some hang on right through the winter long after the leaves are gone. They depend on being blown off by winter gales, and in many years they are very abundant. It is not clear that they are eaten by any species. The seedling are the first tree seeds to germinate and appear in February. Their autumn colours are less spectacular than many trees, as they slowly lose their green and turn yellow. Leaves start to fall on Sep 9 (range 47 days, between Aug 17 and Oct 3). In the autumn the leaves are hosts to a fungus called Tar Spot, which forms deep black spots on all the leaves. In wet years there is another fungus, which forms tiny white dots all over the leaf. They are usually fully turned by Oct 25(range 63 days between Sep 15 and Nov 17). They are bare by Nov 8 (range 23, days between Oct 26 and Nov 19). They have an active growing season on 243 days, (range 56 days, between 217 and 273 days.). Sycamores carry the heaviest aphid load of any tree, and are thus an important source of food for juvenile tits. The aphids attract Lady birds, and a very wide variety of insects are associated with pollination or eat the leaves. The aphids also deposit sticky honeydew on the land, and cars beneath them. In the early autumn Squirrels often strip the barks from young shoots to get at the sap, and this can create distorted trees.

**36 The Purple Sycamore,** ***Acer pseudoplatanus*** *atropurpureum*, is a naturally occurring variant in which the underside of the leaves is purple instead of green. It is a dramatic tree, though it can be confused with colour forms of the Norway Maple. It is available in cultivation. There is a single young specimen, obviously self-sown in the Tumps at ST5708 7469. There is a second tree on the Old Toll Road at ST5665 7498, which may have been planted in error.

**37 The Variegated Sycamore, *acer pseudoplatanus variegatum,***has leaves blotched with yellow, and can be confused with forms of the Norway Maple. There are four trees that are part of the Ladies Mile avenue, and may have been planted in error for Small-leaf Lines. There is one on the Old Toll road avenue, and one close to the Stoke Hill lights on Saville Road,

**38 Field Maple. *Acer Campestre.***  Native. Found in 82% of the regions squares in the Flora 2000. Present in 11% of the Downs hectare squares. Biodiversity value high. The national champion has a girth of 440cm. In Bristol there is one in Crabtree Slip wood with a girth of 370cm. Normally thought of as a hedgerow tree, this species makes an attractive slow growing small tree if grown in the open. There are two particularly fine planted specimens on Clifton Green at ST5661 7299 at the top of the ZigZag and another a ST5684 7322 on the edge of Clifton Down. There are a number on the Gorge slope. Their leaves are small in opposite pairs, up to 8cm broad on a long 5 cm stalk which is often reddish. They often have just three obvious blunt lobes with the two lower lobes reduced in size, but some forms have the full five lobes. They come into leaf on Apr 3and into flower ten days later (range 27 days) Their yellowish green flowers are held upright in small bunches, and glistening with nectar and last for four weeks. In most years large numbers are pollinated and they ripen through the summer, and are usually ripe around Oct 12(range 34 days). The twin seeds are at 180 degrees to each other. They are very persistent and stay on the tree for at least twelve weeks, staying well after the leaves are gone and often turning the whole tree brown. They do not seem to be eaten by anything, but far fewer of them germinate than the Sycamores so that there are many fewer saplings. The leaves start to fall around Oct 16 (range 60 days) and are usually fully turned to a brilliant yellow by Oct 9, but this has a large range of 53 days. They are usually bare by Nov 11 (range 49 days) and they have a growing season of 221 days (range 52 days). The bark is finely fissured into small squares. Moment of Glory, mid-October.

**39 Silver Maple. *Acer saccharinum***. Found in just 6% of Downs hectare squares, the species is native to eastern N America and was introduced in 1725. In Bristol it was widely planted after 1950 in Parks, as it grows very fast, and has very attractive leaves that are delicately pointed and white underneath. They are five pointed, with very deep notches between the lobes The tiny red flowers are carried at the tips of shoots at the end of February, usually at the top of the tree so they are hard to observe. and the paired papery white-winged seeds fall at the end of May. However, they do not ripen in our climate as it is not warm enough, so there is no regeneration. The leaves turn a spectacular yellow in the autumn and contrast vividly with the silvery underside. The largest in Bristol is on College Green with a girth of 300cm. Comparatively few have been planted on the Downs- one is close to the fortifications of Clifton camp at ST5670 7332 close to Observatory Road. Another was planted as part of the Stoke Road avenue at the traffic lights at ST5674 7521, and may have been planted in error. Another is on Ivywell Road at ST5625 7499 The largest measured has a girth of 210cm by the Stoke hill lights.

**40 Norway Maple . *Acer platanoides*.** A European tree which is happy in South Sweden, but failed to cross the channel in time. First introduced in 1683. Found in 14% of the regions squares in Flora 2000, it is present in19% of the Downs hectares.The national champion has a girth of 540cm. The largest in Bristol is in Ashton park with a girth of 440cm. On the Downs the largest is on Clifton Green with a girth of 210cm. It is fast growing, its seedlings can outgrow Sycamore, and it makes a fine tree, but almost all the trees on the Downs have clearly been planted. It is present in four avenues, but in every case it is clearly an infill. Its distinctive features are that the bark is not shed like the Sycamore’s but has vertical furrow. The flowers are held upright and appear before the leaves come out on Apr 5 (range 29 days, between Mar 23 and Apr 21) They last for five weeks. The seeds have the familiar twin wings, and are usually produced in very large numbers, though very often they are infertile and fall early coating the ground. They can regenerate naturally, but there is no evidence that they do so on the Downs There are a number of varieties with different colour forms available from garden centres, and they have been widely planted in Parks in the past half century. They turn a magnificent array of reds and purples in the autumn. They start falling on Oct 9 (range 48 days) and are bare by Nov 14 (range 29 days). There are three fine trees on Clifton Green, each with rather different characteristics. Moment of Glory, early April and October.

**41 Red Maple. *Acer rubrum.***  Native to North America as far north as Newfoundland this tree was introduced in 1656. It plays a major role in the dramatic colours of the New England Fall. In Bristol it is a rare tree, but several young trees have recently been planted. On the Downs one was planted in 2015 on Sion Hill at ST5678 7316 as replacement for a tree that died, and it is doing well.

**42 Common Oak. *Quercus robur*.** Native. It is present in 79% of the region and in 45% of the Downs hectare squares. Biodiversity rating, high. The national champion has a girth of almost 13 metres. Ashton Park has an oak with a girth of 840cm, and in Combe Dingle there is a 700cm tree. The largest and oldest on the Downs is at ST5652 7391, at the top of Bridge Valley Road. It is shrouded in ivy and almost invisible but has a girth of 400cm, suggesting that it is over 160 years old. Most of the trees on the Downs surface have been planted, often to commemorate someone or something. The Coronation Oak planted in 1903, and now suffering from a fungal infection, is a fine tree. It dominates the top of Bridge Valley Road at ST5658 7389. A number of young trees have been planted, often as memorials, and are growing well. Oaks come into leaf on Apr 15 (range 33 days between Apr 2 and May 5), and their catkins descend about ten days later on Apr 25 (range 27 days, between April 15 and May 12), and usually last for two weeks at most. One result is a great deal of annual variation in the number of acorns initially produced. The depredations of the Oak Knopper Gall Wasp are severe. This is a recent alien, which spends one year in the Turkey Oak and the next in the Common Oak. It lays its eggs in the young acorn, and the developing grub turns the acorn into a spiny green blob that can never germinate. It is now a rare year when there are any ripe acorns available to Jays and Squirrels. Further Oak Wilt ensures that any sapling oaks that are not in full sun die, though there are a number of young self-sown oaks in scrubby areas. Common Oaks often produce secondary shoots in August, especially in hot wet summers, and this Lammas growth can be greater than the initial growth of shoots in the spring.

Oak leaves turn brown later in the year than most trees on average on Nov 6 (range 43 days). They are usually bare by Nov 30 (range 35 days, between Nov 14 and as late as Dec 19). Their normal growing period is around 228 days, with a range of 43 days, between 201 and 253 days. They are particularly associated with Oak apples, that seem to affect young trees, and in some years every leaf carries dozens of Spangle Galls, but the occurrence of these is intermittent.

**42 Cluster Oak. *Quercus robur cristata.*** Native**.**The original Cluster Oak was found in Savernake Forest in Wiltshire in the 1940s as a natural sport. It is a tree that grows very slowly indeed, with very short shoots, and leavers that are all clustered and distorted. However, it does come true from seed. One is planted close to Proctors Fountain, at ST5663 7378 and probably dates from the 1950s. It is a very rare tree.

**43 Sessile Oak *Quercus petraea.***  Native, but it is the normal oak of the north and west of Britain. Biodiversity value high. It is found in just 7% of the local region, though it may have been missed. The national champion has a girth of over 13 metres. The largest in Bristol with a girth of 700cm is in the Woodland Trust Knoll Hill Reserve. There is a single tree on the Downs, growing out over a vertical drop above the New Zigzag at ST5638 7391. It is certainly a century old, but it is not possible to measure it safely. The Sessile Oak is distinguished from the Common Oak by the fact that the acorns are carried directly on the shoot, not at the end of a pedicel. The leaves are also different, tapering to a point at the base where they join the petiole, whereas the Common Oak has two little ears at that point. However, the two species readily hybridise, and it is often not easy to be certain of their identity. It comes into leaf about two weeks later than the Common Oak on Apr 28 (range 26 days, between Apr 25 and May 12). Its catkins appear in early May and last for two weeks at most. Acorns resulting have never been seen. It the autumn it is fully turned to brown on Oct 29 (range 20 days, between Oct 18 and Nov 7). It is the last tree to go bare by Dec 10 (range 22 days between Nov 27 and Dec 19). It has a growing period of 224 days, close to the average for all tree species. The range is 26 days between 210 and 226 days.

**44 Turkey Oak. *Quercus cerris.*** This is a Mediterranean species introduced in 1735. It was found in 10% of the region in the Flora 2000, and is increasingly widespread in woodlands. Biodiversity value, medium. On the downs it was found in 15% of hectare squares. It is fast growing and makes a fine specimen. The national champion has a girth of 850cm. Ashton Park has one with a girth of 480cm and Stoke Lodge 475cm. On the Downs the largest is on the Zoo Banks with a girth of 300cm, though there are a number of double and twin trunked trees, evidence of previous attempt to control its spread. There are two fine trees, with very different forms of growth, planted on Clifton Green, at ST5690 7334. Its distinguishing features are the leaves that are very deeply toothed, and its buds have hairs growing out of them, a very distinctive feature. They are also very variable both in leaf size and shape and in their form of growth. They produce very large acorns from spiky acorn cups, and the crop varies considerably from year to year. They are also the host in its second year of the wasp that devastates the acorns of Common Oaks. They are now very widespread in native woodlands, and regenerate very easily. They come into leaf on Apr 13 (range 33 days, between Apr 2 to May 5) and their catkins appear about ten days later on Apr 27 (range 27 days, between Apr 15 and May 12). The acorns ripen and fall on Sep 28 (range 19 days, between Sep 12 and Oct 1). They are eagerly collected by Squirrels and Jays in the absence of Common Oak acorns. In the autumn they turn very slowly, and in some years their leaves will stay on the tree deep into the winter so that they are nearly evergreen. On average they are bare by Dec 9 (range 43 days between Nov 18 and Dec 31).

**45 Holm Oak. *Quercus ilex.***  This is an evergreen Mediterranean tree which has been in this country since 1500. Distribution 36% of Downs hectares. Though its acorns are a key part of the food of both birds and squirrels, nothing will grow under the deep shade that it creates. Its seedlings grow rapidly, and it is increasingly found in woodland, though the Flora 2000 only identified it in 8% of the region. The national champion has a girth of eight metres. The largest in Bristol is in private ground in Clifton with a girth of 550cm, and in Sheep Wood, Westbury, there is one with a girth of 530cm. On the Downs they were planted as a screen for the Water Reservoir, and have a girth of over three metres implying an age of at least a century. They are also common on the Zoo Banks, and may have been planted there, but most of them are multi-trunked, the largest with ten trunks, some of them layering, suggesting that there was a serious attempt to remove them at some point. It is not easy to appreciate them as they are now part of a dense woodland, but some of the trees are very remarkable. It is a tough, vigorous tree, fast growing when young, which will reshoot when it is cut down. It also responds vigorously to pollarding, and will grow back from being cut to a mere stump. As a specimen tree it makes a fine statement, but if left uncontrolled the species can spread rapidly over an area and dominate it. Its catkins appear around May 30, a month later than other oaks, and last for two weeks, before coating the ground in dead catkins. The fruit, which are rather small acorns in a neat cup, are ripe on Oct 17 (range 46 days, between Sep 27 and Nov 12) and are produced in great abundance every year. They are regularly cached by Jays and Squirrels in containers, walls and the cliff face of the Gorge. The leaves last about two years and fall in June at the same time as the light green young shoots appear. They were also abundant on the Gorge, threatening the habitat of the rare cliff-face plants, but as a result of heroic work by staff, and the use of a poison that can be painted on the leaves, many of them have been removed. Most have gone from the Gully, but baby plants continue to spring up regularly.

**43 Red Oak. *Quercus rubra.*** The tree is native to eastern North America and arrived in Britain in 1724. St Andrews Churchyard in Clifton has one with a girth of 300cm. It is a very vigorous fast-growing tree with characteristic huge leaves with sharp points at the end of the veins. There is a single specimen in the triangle of land by Proctors Fountain, ST5658 7379, which was probably planted around 1950. When the leaves first appear they are a clear bright yellow and take about three weeks to turn green. Neither catkins nor acorns have been observed on this tree. In October it turns a brilliant red, starting at the top, and it is usually fully turned by Oct 3 (range 40 days, between Sep 12 and Oct 22). They are usually bare by the end of the month. Moment of Glory, mid-October.

**47 Scarlet Oak. *Quercus coccinea****.* This species is native to eastern N America and reached Britain in 1691. It is a smaller tree that the Red Oak, with much more deeply cut leaves. The specimen on the Downs is on the land by Proctors Fountain at ST5662 7380. It too turns a deep red in the Autumn and does not appear to have any acorns. Moment of Glory, mid-October.

**48 Hungarian Oak. *Quercus frainetto****.* The species comes from the Balkans and was first introduced in1838. It makes a magnificent specimen and a few were planted as part of the Saville Road avenue in 2016. They have large leaves and grow very fast. They come into leaf in mid-May and often have a second growth in mid-July. This tree is not grown elsewhere in Bristol.

**49 Bhutan Pine. *Pinus wallachiana.*** Afghanistan**.** This is a graceful five needle pine from the Himalayas, introduced in 1823, and still widely sold. The largest in Bristol is in the Grove, in Stoke Bishop, with a girth of 395cm. The most prominent in Bristol is in Victoria Square. There is a single tree on the Downs just behind the toilet block by the water tower. It has large cylindrical cones up to 30cm long, and covered in white resin, which take two years to mature on the tree before falling. Does not regenerate.

**50 Black Pine.** ***Pinus nigra.*** Austria. Introduced to Britain in 1835**.** Found in 10% ofthe Downs hectare squares.This was a very popular pine in Victorian times and grows well. It was widely planted on the edge of the Downs and round the Gully in the 1880s, as well as on the eastern lip of a huge former quarry to form the group called the Seven Sisters. A replacement group for these trees has been planted close to the original site, but it is unfortunately a group of Scots Pines. They do regenerate, but not very widely, as Squirrels tend to take all the nuts. One has made itself into a natural bonsai in a crack on the quarry face at the bottom of the Gully. The national Champion has a girth of 580cm and the largest in Bristol is in the Woodland Trust Knoll Hill Reserve at with a girth of 460cm. The largest on the Downs is probably the one at ST5635 7434 on the face of the Gorge close to the Peregrine watch site with a girth of 310cm. The bark of older trees is very distinctive and handsome, the leaves are stiff pairs of needles 15cm long, and the cones are up to 8cm long.

**51 Scots Pine. *Pinus sylvestris.*** Native, but in Bristol always planted. The largest in Bristol is in Blaise with a girth of 280cm A small group were planted in front of the care home which replaced the Ostrich Inn at ST5692 7552. They have not grown particularly well and it rarely grows well in Bristol. It has small needles in pairs, and small cones. A group of seven trees has been planted close to the three Black Pines, the remnants of the Seven Sisters, to provide a replacement for them.

**52 Plane**. ***Platanus x hispanica*.** Biodiversity value low**.** A hybrid created in c1680 by a cross between the Eastern Plane and an American plane. It grows fast, and has been a favourite street tree, especially in London, but also in Bristol. It is present in just seven of the Downs hectare squares, three of them as part of an avenue, probably planted to fill a gap. The national champion has a girth of 910 cm and the largest public tree in Bristol is in Brislington Brook, with a girth of 675cm. A tree in Goldeney Gardens has a girth of 705cm. The largest on the Downs is on the edge of North View, at ST5734 7580 and has a girth of three metres, though, as they grow very fast, it is probably no more than fifty years old. There were two close together here, but one recently was felled, and replaced by a new Plane tree. They are readily recognised by their habit of shedding platelets of bark, which creates a wonderfully patterned trunk. There are two younger ones at the start of Circular Road at ST5668 7517. It comes into leaf quite late on Apr 17 (range 40, between Apr 2 and May 12). The leaves are very large and similar to maple leaves. The spherical flowers appear soon after and develop into spherical seeds. They remain on the tree all winter, though are eaten by Goldfinches. Leaves start to turn on Oct 25 (range 24 days, between Oct 9 and Nov 2) and they are bare by Nov 25th, (range 37days Between Nov 9 and as late as Dec 16) Their active year is 222 days with a range of 40 days.

**53 Cherry Plum. *Prunus ceracifera.*** A European tree, but very widely naturalised in Britain. Distribution, recorded in just 2% of the local region and almost certainly under-recorded, but in 28% of Downs hectare squares.This is an unassuming tree, closely related to the Blackthorn, which is the first tree to flower every year. The average date on the Downs is Feb 13th (range 77 days between Jan 10 and Mar 28). It comes into leaf at the same time as the flowers. The flowers last on average eight weeks, presumably because there are very few pollinators around. It is always the first spring blossom and usually three weeks ahead of Blackthorn, with which it is often confused. A key distinction is that the young shoots of Cherry Plum are green, whereas on the Blackthorn they are black. Also, the Cherry Plum lacks the sharp spine of Blackthorn, and does not sucker. It is normally a hedgerow tree, but given space will sprawl. A fine example can be found on the edge of the Gully at ST5634 7469. In rare good years it can produce a fine crop of golden yellow plums which ripens in mid-July.

Moment of Glory, in flower late February.

**54 Purple Plum. *Prunus pissardii.***  From Persia, this tree has been widely planted since 1880 in streets and parks. It is a close relative of the Cherry Plum but makes more of an upright tree, and comes into bloom on Feb 14 (range 69 days, Between Jan 10 and Mar 20). Its flowers are a delicate pink, and its leaves are a dark purple and tend to get darker through the season. In a good year it can produce a small dark plum. Its leaves fall on Oct 15 (range 83 days between Aug 25 and Nov 16). In some years they fall early and steadily, in others they stay on the tree almost to the end. It is bare by Nov 12 (range 59 days, between Sep 29 and Nov 16). A clump of three have been planted close to the Westbury Road close to the northern tip of the Downs at ST5730 7598 which always flower well in February. They are surrounded by suckers with green leaves. A very young self-sown tree is part of the shrubby fringe of the gully at ST5644 7459 whose pink flowers stand out in February. Moment of Glory, late February.

**55 Wild Plum. *Prunus domestica*.** Native. Plums have been cultivated across Europe for centuries, and a wide range of varieties exist. It easily gets into the wild, and sometimes suckers. It flowers early. There is one on the Downs in the Westbury Park area which produces excellent sweet plums. Another tree sits halfway up the cliff face below the Observatory, and one grows on the cliff at the Suspension Bridge entrance.

**56 Gean or Wild Cherry.** *Prunus avium***.** Native. Biodiversity value high. It is distributed in 17% of the region, and 13% of the Downs hectare squares. The national champion has a girth of 560 cm and the largest in Bristol are at Eastwood Farm and Victoria Park both with a 250cm girth. The Gean is a vigorous native tree that spreads by both suckers and from seed. There are a few on the lip of the Gorge, and there is a fine young tree in the Gully. In Leigh Woods there are some magnificent specimens especially in the strip south of the Bridge. The only sizable tree on the surface of the Downs is on the Westbury Park path, and is about a century old. When in flower they are easy to see, and in winter the bark which peels horizontally is a useful clue to identification. There is a cultivated cherry next to the Observatory. They come into leaf on average on Mar 17th (range 22 days between Mar 4 and Mar 28). They flower on Apr 1 (range 30 days between Mar 22 and Apr 21). Flowers last for five weeks. They produce small rather bitter cherries which are rapidly eaten by Blackbirds and ripen on Jun 13 (range 31days, May29 to Jul 3) and they are one of the very earliest of the autumnal fruit, and normally all are eaten within a month. In the autumn they can become a magnificent red, and are fully turned by Oct 17 (range 26 days, Oct 5 to Oct 31) and bare on Nov 3 (range 52 days, between Oct 5 to Nov 26). Their normal growing period is 230 days. Moment of Glory, mid-April.

**57 Ornamental Cherry. *Prunus avium plena****.* This is a sterile double flowered white cherry with very large bunches of double white flowers in May. There are three fine trees on Clifton Green.

**58 Ornamental Cherry.** ***Prunus serrulata.***Japan. There is a huge range of cultivated cherries that began to be sold in the twentieth century. Two are planted on Clifton Green. The one at the top of the Mall is a very beautiful double greeny-white flower.

**59 Blackthorn. *Prunus spinosa.***  Native. Biodiversity value high. It is present in 89% of the region and in 14% of the Downs hectare squares. Blackthorn is a low growing shrub that rarely matures into a tree. It is very spiny, and suckers rapidly, and easily extends the area of any patch of scrub. It is light loving, so tends to be on the edge of the scrub line round the top of the Gorge, and is fairly unusual on the rest of the Down surface. Its branches are all a deep black. It comes into flower before the leaves, on average on Mar 14 (range 62 days, between as early as Feb 27 in 2016 to as late as Mar 31 in 2010, which had the coldest March since 1962). This is a month after the Cherry Plum, but overlaps with it. The flowers normally last for seven weeks. The leaves appear on March 27th (range 71 days, between Feb7th and April 19th). The fruit, called Sloes, are at first green and then develop a blueish tinge before turning dark blue-black. They are very sour, though they are harvested to make Sloe Gin, and tend to last on the bushes well into the winter. They are ripe on average on Aug 9 (range 43 days, between Jul 27 to Sep 9) and last into early January, 25 weeks later. The leaves turn yellow in the autumn, but rather slowly and the species is usually bare by Nov 8 (range 38 days between Oct 19 and Nov 26). The active year is 225 days long, with a range of 85 days between 195 and 280. Moment of Glory, in flower in March.

**60 Cherry Laurel. *Prunus laurocerasus.*** This tree originates in Asia Minor, and came to the UK in 1576. It is a very tough fast-growing common evergreen hedging plant, but will become a substantial tree if not kept in check. It casts very heavy shade, and nothing can grow beneath it. But its flowers and fruit are used by insects and birds. On the Downs there are one or two saplings on the Gorge edge, but a large tree has tipped over from the gardens of St Monica’s at ST5715 7600 on the corner of Cote House Lane. It is a magnificent site in bloom. The average date of flowering is Apr 1 (range 54 days between Feb 28 and Apr 23) The flowers are cherry like and held upright in short spikes. The fruit are a hard black oval cherry, but are widely distributed by Blackbirds. The average ripening date is Aug 9, range 28 days between Jul 28 and Aug 25. They usually last on the tree for six weeks.Moment of Glory, April.

**61 Portuguese Laurel** Prunus lustianica. This species is quite widely grown as a hedging plant, and sometimes as a tree. It was whitye flowers held vertically in early June followed by small black cherries, that are soon eaten by birds. It is evergreen with narrow crinkly green leaves, and is easily confused with Bay, Laurestinus, or Holm Oak. There is a single specimen growing in scrub on Fountains Hill.

**61 Pear. Pyrus communis.** A single tree is growing on the face of the gorge just below the Observatory at ST5656 7321. It flowers most years but I have never seen fruit.

**62 Hybrid Black Poplar. *Populus x Canadensis.*** The native Black Poplar is a rare tree that grows in damp lowlands, but there have been a wide variety of hybrids created because the tree grows very fast, and its timber was commercially valuable for matches. Its biodiversity value is low. The national champion has a girth of 735cm; the largest in Bristol is a dead stump at Blaise with a girth of 570cm. Victoria Park has a broken-down living specimen with a 500cm girth. Like other parks it had many trees planted in the late 19 century which have all recently been felled because of its tendency in old age to shed branches. On the Downs there is a single specimen growing rather incongruously close to the Children’s playground on Clifton Green at ST5665 7321. The present tree is a shoot from a tree that was prominent in the 19th century, and was called the Poets Tree. It was cut down in c 2000 on safety grounds. Peter Gabbitas wrote doggerel poetry which he sold to anyone who would buy while sitting beneath the shelter of the tree. A wooden bench in the near-by playground carved by Alistair Park acts as his memorial. The tree is hard to recognise as it has a straight trunk for four metres, but when the leaves fall in the autumn the distinctive shape is easy to recognise.

**63 Garden Privet. *Ligusticum ovalifolium.*** Wild Privet is a very common part of all the scrub areas on the Downs, but never grows into the size of a full tree. However Garden Privet will grow to tree size, and has been found in 13 of the 200 hectare squares on the Downs. It has been planted around the toilets at Sea Walls and at the Water Tower and several sites around Clifton Camp.

**64 Locust Tree. *Robinia pseudacacia.*** This tree comes from eastern North America, and reached Britain in 1636. Its biodiversity value is low. It is a member of the pea family, and has very fierce spines on its shoots especially when young. It is a tough tree, and, if cut down, at once suckers widely In Kings Weston there is a large grove of suckers that must have originated from a single tree many years ago. Also in that estate at ST5435 7724 is the largest in Bristol which has a girth of 400cm. The national champion has a girth of 540cm There is a single tree on the Downs, which is infested with ivy, close to Savile Road at ST5686 7546. It is divided in two at one metre and below that has a girth of 330cm. The pinnate 30cm leaves, which have some 25 leaflets, always with a terminal one, appear rather late on Apr 29 (range 36 days, between Apr 13 and May 19) and the white pea-like 20cm flowers hang below the branches and appear very late on Jun 3 (range 39 days, between May 16 and Jun 23). The pea-like pods develop and hold up to eight brown seeds, and often hang from the branches throughout the winter. They do not regenerate. Leaves start to fall on Sep 30 (range 67 days, between Aug 16 and Nov 9). The trees are bare by Nov 15 (range 42 days, Nov 1 to Dec 13). Their active life is 208 days, between 195 and 236.

**65 Spindle.** *Euonymous europaeus****.*** Native. Biodiversity value high. It is present in 42% of the region and in 31% of Downs hectare squares. It normally grows as a small low shrub, but it can form a small tree given the opportunity. Its name comes from the fact that the wood is very hard, and can be sharpened to a point, making it a key part of any spinning machine. It is easy to recognise as its bark is green. It comes into leaf on Mar 21 (range 41 days between Feb 20, in 2011, and Apr 2, in 2016). The leaves are opposite and are 8cm long It comes into flower two months later on May 16 (range 46 days, from Apr 24 to Jun 9 in 2013). The flowers are inconspicuous white stars. The fruit are a four-sided capsule which ripens to a bright pink, and then opens to reveal bright orange seeds, which are alleged to be eaten by Robins. The fruit is poisonous to humans. They ripen on Oct 26 (range 24 days between Oct 11 and Nov 7), and the fruit can last on the tree for 15 weeks through to February. In autumn the leaves can turn wondrous shade of green and purple, and they peak on Oct 27, but with a very wide range of 72 days between Sep 6 and Nov 17. This huge range may be related to rainfall. They are bare by Nov 16 (range 55 days between Oct 17 and Nov 17). Their active year is around 240 days. They regenerate readily. Moment of Glory, early November.

**66 Norway Spruce.** *Picea abies****.*** A tree of Northern Europe, which failed to make it before the English Channel opened up, but has certain been present since 1500. This is the traditional Christmas tree, and people sometimes buy rooted specimens, and then plant them on the Downs. They usually fail, partly because the soil is often so thin, but there is one young tree that is growing well at ST5700 7459.

**67 Tulip Tree. *Liriodendron tulipifera.*** A tree from N America, first established in Britain in 1650. It grows well in our climate, but its seeds do not ripen. There are three on the Downs by Clay Pit Road planted in 2017 as replacements for Horse Chestnuts that had died. It has a strange leaf that looks as if the top has been bitten off, and when mature greenish-yellow tulip shaped flowers. These become a cone of seeds rather like ash keys, but bunched together tightly and held upright, falling in the winter. They don’t germinate. The national champion has a girth of 890cm. The oldest in Bristol with a girth of 470cm is in a little grove off Canford Lane at ST 5600 7748.

**70 Wayfaring Tree.** *Viburnum lantana.* Native. Biodiversity value, high. This is a low growing shrub that likes limestone and is present in 34 % of the region and 16% of the Downs hectare squares. It has buds that are naked, without any covering, and there is no real date for the buds breaking. The leaves are pale green ovals, held opposite. The white flowers are held at the top of previous year’s shoots in a flat topped 10cm umbel. They appear on Apr 22 with a range of 36 days between Apr 6 and May 12. During the summer the berries slowly change from green to red to black. They ripen on Aug 4 (range 55 days between Jul 19 to Sep 12). They are very rapidly eaten, lasting a month at most. The leaves do not turn colour before falling. Moment of Glory May.

**71 Laurestinus.** *Viburnun Tinens*. This is an evergreen garden shrub that has spread quite widely on the edge of the Gorge. Its biodiversity value is moderate. The Flora 2000 only recorded it in 11 squares in the region, but it was probably widely overlooked because it can readily be confused with Bay or Portuguese Laurel, especially if it is not in flower. It was found in seven hectare squares on the Downs. It is a winter flowering plant, often in flower throughout the winter, though not reliably. The average first flower date is Aug 29th, and on average it lasts for 22 weeks, much longer than any other tree species. In some years some trees don’t flower until the spring. The flowers are white, in a flat-topped umbel, and not very conspicuous. The resulting fruit take a year to ripen changing from green to black, and are usually seen in mid-September. Depending on the previous year’s flowering they can be found right through the autumn and into January. It clearly does regenerate, but not very much.

**72 Black Walnut.** *Juglans nigra.* ANorth American tree, **i**ntroduced in c 1650. The national champion has a girth of 670cm. There are two close together at the northern end of the avenue along the old Toll Road to Stoke Hill at ST5666 7504 The larger one has a girth of 250cm, implying a planting date just after the second world war. There is a third one, surrounded by a good deal of scrub at ST5664 7461. These are the only three in Bristol. Their nuts grow in pairs, and are enjoyed by the Squirrels, but do not regenerate.

**73 Common Walnut. *Juglans regia.*** It is a tree from southern Europe which may well have been imported by the Romans. It was found growing in just 3% of the region, but may have been overlooked, or ignored as a planted tree.It is present in 14% of the Downs hectare squares, and almost every tree is self-sown. Biodiversity value, modest. The national champion has a girth of 610cm. The largest in Bristol is in Stoke Lodge with a girth of 370cm. The largest on the Downs is near Saville Rd at ST 5676 7536 with a girth of 120cm, suggesting an age of about 50 years. It has recently been cleared from Ivy and scrub. A very young planted specimen is close to the Suspension Bridge at ST5662 7313. The male flower is a drooping 10cm catkin that appears just before the leaves, which are the very last to open every year, on May 22, (range 36 days from May 1 to as late as Jun 6 in 2016). The 30 cm leaves are pinnate with seven leaflets held alternately. The large green nuts develop steadily and are mostly taken by Squirrels before they ripen. The tree is bare on Dec 1 (range 38 days, between Nov 8 and Dec 16). Its active life is just 182 days. Its timber is used for fine furniture.

**74. Rowan. *Sorbus Aucuparia.*** Native. Biodiversity value, high. This is a tough limestone loving species, very familiar in northern England, and a close relative of the Whitebeams. Regionally it is present in 10% of squares. The largest in Bristol is at Eastwood Farm with a 205cm girth. The national champion has a girth of 480cm. It is normally a short-lived species. Only one plant is known on the surface of the Downs, on the Zoo banks at ST5659 7400. The branches are upswept. The pinnate leaves appear on Apr 5 (range 27 days between Mar 23 and Apr 19) They have up to nine pairs of leaflets and are up to 20cm long. It flowers in May, with broad discs of white flowers held upright, which may contain 250 individual flowers. The green fruit ripen rapidly to produce hanging bunches of up to 100 bright red fruit in early August that are rapidly eaten by thrushes. Moments of Glory, May and August.

**75 Common Whitebeam. *Sorbus Aria.***  Native. Biodiversity value high. Present in 5% of the region and 26% of the tetrad squares on the Downs. More than 50 species of Whitebeam have been identified in Britain, as each limestone gorge has developed one or more micro-species. At least 19 have been identified in the Gorge. They are the result of hybridisation between the Rowan, the Common Whitebeam, and probably alien Whitebeams planted in parks and as street trees. They all share basic characteristics, but differ in the shape and the dentition of the leaves, and in some cases details of the fruit, and they have been distinguished by DNA analysis. Most of the wild specimens on the Downs are on the Gorge edge and down the cliff face. There are a number of labelled trees in the Gully, and an attempt has been made to prevent the goats killing them by protecting the bark with wire guards. The national champion has a girth of 505cm. They often develop multiple trunks, and are also often inaccessible, and there is no data on the girth of Bristol trees. They are readily identified by their upswept branches, with thick pale green buds in winter, and pale green leaves with white felted undersides.

The beautiful spring leaves, with dense white hairs underneath, unfold on Apr 10 (range 34 days between Mar 23 and Apr 27. The white flowers are held above the branches in flat umbels, but the amount of flower varies greatly from year to year, and is entirely absent in some years. They appear on May 9 (range 32 days between Apr 24 and May 2) and they last in flower for four weeks. The green berries ripen from yellow to red and are ripe on Aug 26 (range46 days, between Aug 8 and Sep 23). Whitebeams are always the first species to lose their leaves, which drop off without significant colour change. On the cliffs they are often affected by hot dry weather. The average first leaf fall is Aug 12 (range 36 days between Aug 8 and Sep 23). They are bare by Oct 7 (range 50 days between Sep 20 and Nov 9) Their active year is 181 days, ranging from 147 to 230 days. After the leaves fall the berries remain for up to seven weeks. Moment of Glory, mid-May and early September.

**76 The Bristol Whitebeam*. Sorbus bristoliensis.*** Native, and originally found on the Leigh Woods side of the Gorge in 1839. Its distinctive feature is the deep dentition from about half way up the leaf. There are four planted trees. One was planted in 1973 to commemoration the 600th anniversary of Bristol’s charter, and can be found at ST5652 7427 close to Circular Road at the top of the Gully. Two more whips were planted as replacements at the site in 2016. A second well grown specimen is close to the Promenade at ST5654 7364.

**77 English Whitebeam. *Sorbus anglica.***  Native. This species is best seen in the wild in Wales. One was planted in 1973 at ST5652 7427 close to Circular Road, and has grown far more vigorously than the Bristol Whitebeam close by. It has rather larger leaves than some whitebeams.

**78 Willmotts Whitebeam. *Sorbus willmottiana.*** Native. Confined to the Avon Gorge. It has rather smaller leaves than other species. A specimen has been planted in the small display of rare plants at the side of the Suspension Bridge at ST 5659 7316. It is growing very slowly.

**74 Service Tree of Fontainebleau. *Sorbus x latifolia.*** This is a natural hybrid found in France in 1750, and widely planted, along with Swedish Whitebeam in streets and parks. It has very broad leaves that are hard and dark shiny green. There is one tree on the Gorge slope close to the Inclined Plane on the Downs at ST5628 7429.

**80 Yew.*Taxus baccata.*** Native. Biodiversity value high. Present in 27% of the region and 38% of Downs hectare squares. The Yew is a native evergreen whose foliage is poisonous to horses and cattle, and, as a result, farmers removed it from hedgerows, and churchyards are the best place to find it. Its long straight branches were used in mediaeval times for making Long Bows. There are a large number of very ancient yew trees in churchyards and Long Ashton has a very notable one. There is also an ancient one in Leigh Woods on the line of a parish boundary. The Gully was called Yewcombe by the Anglo-Saxons, later corrupted to Walcombe. The national champion has a girth of 17 metres, and may be 2000 years old. The largest in Bristol is in Stoke Park with a 450cm girth. And the largest on the Downs is the triple-trunked tree close to the Gully and Circular Road at ST5638 7448 which measures 440cm round the base. Individual trunks are 350cm implying a minimum age of 140 years. It has some earthworks around it which might have supported walling or fencing to keep stock grazing the Downs away from it.

The startlingly wide distribution on the Downs is largely the result of its spread in the past fifty years and the trees capacity to flourish in the shade of other trees. It readily regenerates, and becomes a part of the development of clumps, where it is a fierce rival with ivy for dominance. It is the main canopy of a large part of the south slope of the Gully, and its deep shade ensures that no other plant or tree species can occur.

Yew trees are either male or female, and the male trees produce globular catkins which release their yellow pollen in huge clouds on average on Feb 21 (Range 40 days between Feb 2 in 2008 to Mar 14 in 2010), and they continue to be in flower for six weeks. During this period male trees can readily be distinguished from female ones as they look a paler green colour.

The fruit are small green berries which slowly grow and ripen to red on average on Aug 8 (range 57 days, between Jul 9 to Sep 4). It is now the female trees that are easily identified. The seeds ripen progressively over the course of the winter, and are greedily eaten by Wood Pigeons and thrushes. The red arils are not poisonous, but the nuts themselves are, as is the foliage especially when dry. The berries usually last for around 18 weeks, and are gone by mid-December. Yew Timber is a fine red colour. Moment of Glory, late February and September.