

## Winter trees

On two beautiful days in mid-November 2018 a group of members gathered at the Yorkshire Arboretum to study the winter characteristics of deciduous trees. **ANTONIA JOHNSON** writes about some of the things she learnt and shares the notes she took while in the field.

We were welcomed by a workmanlike group of tables scattered with samples of twigs, together with a pre-publication copy of *The Field Guide to Winter Twigs* (published BSBI November 2018, see review pp. 221–222).

But before we got down to the nitty gritty our host John Grimshaw gave a short history of the arboretum: how what we saw (blessed with autumn sunshine rather than winter gloom) represented tiers of landscape: ancient parkland was succeeded by farmland and the drive to ‘dig for victory’; then in 1979 it was laid out as an arboretum, and planted. The topography shows a shallow valley running east-west, sandy loam to the northwest, clay to the east—dig a hole it fills with water. Thus they have developed a method of planting above the water table, maybe a foot above soil level (as seen on a walk the next day). The soil is pH neutral to acid, bar a strip of alkaline where an old road leaches calcium.

The collection numbers 6,000 individual trees, 1,700 different taxa; mostly trees, few shrubs—John says he’s working on that, with Collection Manager Jonathan Burton. Maintenance is confined to mowing around trees and a few main arterial routes, given small staff; however they have a team of much-appreciated volunteers. Visitor numbers have risen 15 to 20% per annum over the last five years. The Arboretum posts bird news—yesterday a goshawk took a moorhen off the newly renovated lake (!)—and the birders come winging in. The team were awaiting a decision on funding for the Tree Health Centre, where they could host events such as the Pests and Diseases Study Period we are planning for 2020; this was later granted.

To business. John Poland, who had written *The Field Guide to Winter Twigs* during the past six years, introduced us to some terminology:



A group of members walking around the Yorkshire Arboretum in the early afternoon sunshine during a two-day study period observing different identifying characteristics of trees in winter. In the background to the left is *Betula ermanii* ‘Grayswood Ghost’.





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Buds are key characteristics in identifying a species in winter: **above left** is *Cornus domestica* with slightly sticky buds and **right**, *Sorbus carmesina* has minute white hairs on the edges of its bud scales.

**Above, left**, *Sorbus* 'Glenkiln' is clearly identified by the white wool on its stems and **right**, the bud of *Fraxinus chinensis* subsp. *rhynchophylla*, showing 4-ranked scales.

- a twig = one year, this year's growth
- branchlet = shoots two to four years old
- bud scales = modified leaves or stipules that protect the immature leaf or flower
- leaf scars = the marks left on a twig after leaf fall, often quite distinct in colour and texture within which can be seen bundle scars = where veins were connected to the twig; n.b. 1 more bundles = more veins = more complex leaf, e.g. pinnate; n.b. 2 if you pull off a leaf rather than waiting until after natural abscission, the scars are unlikely to be so clear
- Branching being alternate, opposite, or whorled (with more than one bud at a node).

As an aside it was pointed out that Oleaceae have opposite buds but no interpetiolar ridge, and we note that an absence can be as useful a point of identification as something seen. One of the treats of spending time with experts who have looked, and looked, and seen: the dropping in of observations that place a fact in a particular pigeonhole, for later retrieval.

- Stipules = pairs of appendages that protect the budbreak

Here another aside: they are why we have Bank Holidays: the Earl of Avebury, John Lubbock, was writing a book on buds and stipules and he was a banker—he pushed through the Bank Holiday Act to give him time to write!

- Pith! Angled pith, chambered pith... when you cut a twig across, the section may have a particular shape within the roundish whole; best to cut across top two-thirds, between second and third internode. (Pith is porous, non-conductive tissue; in older branchlets the cambium growth has compacted the pith, so much smaller.) So for instance both *Quercus* and *Castanea sativa* have 5-angled pith; *Alnus* has 3-angled pith; *Betula* also has 3-angled pith, to differentiate: *Alnus* pith turns brown, the edge of pith first.

As we discussed the precise words for each characteristic, we passed around the samples gathered and brought out our hand lenses for a closer look at

how bud scales vary from *Fagus* (4-ranked) to *Quercus* (5-ranked); at how to discern stipule scars: described understandably as 'one of the most daunting steps for a newcomer' in the book's introduction, John (P) had decided it was a necessary beginning for the IDS members present, so we duly squinted at the generally small marks to the sides of the leaf scars. Sometimes stipules are attached to petiole rather than twig, in which case no scars are left, but it is essential to know if they're there or not; possibly if there is an anomaly it is the taxonomy that is wrong. This is an example of how John Poland has come to believe that the characteristics observable in the winter twig are more reliable identifiers than the tree's summer clothing; every tree and shrub has its own unique combination of characteristics. It was a treat to be introduced to winter identification by someone with such conviction.

We also looked at the angle of buds. *Nothofagus* and *Fagus* have oblique buds, *Carpinus*'s are straighter, more in line with the twig, and the angle of bud pertains to the structure of the tree, just as if buds appear in whorls of three, for instance, this pattern will be repeated and reflected throughout the tree's architecture.

We noted that the book's 'winter' begins 15 November (we were a day early), and it is a fact that samples may vary visually through the course of the so-called dormant period, for instance twigs may still be green at the beginning of winter then less so towards the end (determined as 31 March for this book), perhaps because the waxy cuticle that is protecting the young growth begins to lift, making the twig greyer (truly green will have



The distinctive buds of *Sorbus matsumurana*.

stomata visible to the naked eye).

There are too many characteristics to properly describe in this short review of our studies, but take it as read that we were learning all the time.

Thanks to the unusually clement weather, we were able to spend some hours outside after lunch, looking at characteristics from species to species. John (P) made the point that to get the hang of discerning all the different details it is useful to practice on a well-named collection, before branching out, as it were, on unidentified trees.

[Now I am at risk of presenting the reader with a list of short notes, as scribbled on our walk, each observation being individually fascinating but perhaps less exciting without the tree we were looking at as I wrote.]

We'll all have observed that some trees' leaves remain on the ground for months, while others seem to disappear very quickly, and we presume it is to do with the worms' preference, that *Acer* leaves may contain much more sugar, whereas the Fagaceae are heavy in tannins, less palatable.

- *Corylus maxima* Purpurea Group, buds are purple too, slightly flattened; *C. columna* buds always oblique; *C. avellana* bark splits when tree semi-mature, then becomes smooth again later
- *Hamamelis*—superposed leaf buds; stellate hairs on twig
- Leaf difference between *Nothofagus* and *Zelkova*: latter always has veins leading to a serration. Or there are no serrations without a vein leading to them
- Pecan—*Carya illinoensis*—naked bud, bud a distance above the leaf scar, dotted bundle scars
- *Carya* have solid pith, angled; *C. ovata* male catkins already visible
- *Pterocarya*—to distinguish from *Carya*—chambered not solid pith; chamber larger in younger twig; solid threshold dividing each year's growth; older branchlet has dark hollow rather than a chamber



Leaf scars are among the identification characteristics of different species: **left** is *Aesculus turbinata* and **right**, the monkey-faced scar of most *Juglans* species—*Juglans cinerea* has a sheep face scar.



**Above, left**, the ridged twig bark foreshadows the ridges that develop later in *Castanea sativa* and **right**, *Platanus × hispanica* showing the fused stipules making a cap around the leaf bud.

- *Pterocarya rhoifolia* prefers not to be too wet—here planted in varying places, and the drier the spot the better the growth
- Oak buds: *Quercus robur*—hairless; *Q. petraea*—hairy; hybrids somewhere in between, and can vary on individual trees. *Q. cerris* nb hairy bits are persistent stipules; bark is hairier too. *Q. palustris* (tiny buds, globose) versus *Q. coccinea* (leaves larger and hairier, buds much bigger, densely hairy, ovoid); *Q. rubra* buds are more conical, and darker. Possibly more reliable differentiation than leaves, which can be so very variable on any single tree
- American v European oaks—American ones colour in autumn, and most buds are notched; red oaks retain dormant acorn, coming to maturity in second year

Some more terminology [when we were looking at a very knobbly plane]

- boss (lump)
- burl (lump with no epicormic growth)
- burr (lump with epicormic shoots; possible cause, agrobacterium)
- *Magnolia* stipule scar goes right round, can feel a fine line. Also *Liriodendron* and *Platanus*. *Magnolia* inner bark has a scent
- *Tilia platyphyllos* has hairy twigs, oblique buds, stipule scars; *T. cordata* smooth twigs
- Common lime, longer internodes, bigger buds than *Tilia cordata*
- *Tilia americana* has leaves slashed, long teeth, but difficult to separate in winter
- All *Tilia* have flexible twigs, can be tied in a knot
- *Populus*, bud above leaf scar, 5-angled pith. Balsam buds sticky, white under leaf. *Populus × canescens* = *P. alba* × *P. tremula*; all poplars have stipule scars
- *Salix caprea*, branches stay green for several years; *S. cinerea* go dark and have spreading buds
- *Salix triandra*, almond-leaved willow (inner bark smells of rosewater!)
- *Liriodendron tulipifera*, purple buds, green leaves in spring





Photographs © Antonia Johnson

The group gathered underneath *Castanea sativa* to discuss identification characteristics. The grey-purple bark has deep spiralling fissures, the twigs purple-brown and buds red-brown and oval in shape.

- *Liriodendron chinense*, green buds (not pruinose), purple leaves in spring
- *Cornus* (was *Sorbus*) *domestica*, fruit like little pomes, chunky, edible when bletted. Can grow to 24 m (80 ft)

When we looked up from our stipule scars et al, we admired the arboretum's overall design and paid tribute to Jim Russell's original layout. What was parkland is now, nearly 40 years later, becoming over-dense, and John (G) concentrates on how and when to thin, to keep open spaces. Some years ago they introduced a swathe of wildflower meadow after receiving funding from Buglife. 'Bee Lines' was intended to encourage insects across North Yorkshire. The grass was sown with yellow rattle (nb can only sow if the grass is very short, will not germinate in long grass) to allow native wildflowers to dominate; 240 different species have been recorded on the site.

We spent some time looking at a planting of natives:

- *Prunus padus* pith has strong tobacco/tannin smell; conical buds, usually adpressed, flexible twigs (only *Prunus* species) and bud scales 3-keeled, with apiculate tip, typical of Rosaceae.
- Spindle—*Euonymus*—Celastraceae—no internodal ridge; green twigs or purple in sun; stomata on underside; n.b. flanged



Photograph © Antonia Johnson

The overall shape of trees helps identify different species within the same genus. **Above**, *Quercus robur* with its wide canopy contrasts markedly with the tight fastigate silhouettes of *Quercus* 'Kloster'.

stems not present here, not a reliable characteristic

- *Acer campestre*, latex in petiole and twig. If true wild form, central lobe is no longer than the width; nursery stock tends to longer central lobe
- *Sorbus aucuparia*—blackish stems, furry, dark red, oblique buds
- *Cornus domestica* (service tree)—green buds

On our second day John Grimshaw talked about the overall shapes of trees, the pleasure of being able to spot and identify species at a glance. Beech with its haze of skinny twigs; poplar tends to very upright branches and branchlets, though *Populus alba* branches more horizontally, untidy.

Ash is a variable visually: can be angular and upright, can be weeping. Three photos, three ages of ash trunks, all very different.

We looked at bark, in its many forms and colours and pleasures: an ancient *Acer griseum* grown near billowy at the top, but its bark was the clinching characteristic; *Betula utilis* can have bright white bark, where *Betula* 'Hergest' is less stark, pinkish; *Prunus* is similar in having horizontal lenticels—in order of preference 1. *P. serrula*, 2. *P. rufa*, 3. *P. himalaica*... all very strokable.

*Salix alba* 'Cardinalis', a narrow-growing cultivar, will flame, brightest in late winter, say March, then gets lost under the new leaves. *Populus* 'Robusta'





Bark is an important identification characteristic: **above left**, *Betula dahurica* and **right**, *Betula ermanii* 'Grayswood Ghost'.

has a coppery spring flush.

Out in the collection, there was lots to see but I will concentrate on the winter identification characteristics.

- In the Pear Glade we note keeled bud scales which apple don't have, also less hairy than apple buds, but break the tip and see golden hairs
- *Castanea sativa*—ridged twig bark, foreshadows the ridges that develop later
- 3 bud scales; grey bumps between lenticels, rough to touch, granular,
- 3 decurrent ridges, from middle and edges, running down from the leaf scar; disappear second year.
- (Surcurrent = running upwards)
- *Platanus*—leaf petiole encloses bud, protects, bud scale hardened by time leaf falls, pith green (why? chlorophyll??). Ochrea—fused stipules at base of petiole wrap round
- *Ulmus* have sunken bundle scars: leaf scar gets corky, bundle scar doesn't so sinks (*U. villosa* here).

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For our final session Jonathan Burton did a bit of a roundup, with diagrams, then a quiz, which was both fun and we were sure would help fix some of the details in our dendrological brains. He also asked us all to say—what had we learnt? What was valuable?

- Don't **assume** any identification is correct, always check
- Purpose of ident? The importance of accurate information about your tree collection
- Twigs have scents
- Smallest features reflecting overall growth patterns
- Noticing commonalities across different species, helping to understand families and taxonomy
- Winter id means looking at and enjoying trees year-round

As ever, we enjoyed the cross-pollination between professionals and IDS members, sharing ideas.