Norfolk Flora Group – Winter Newsletter 2015-16

Welcome to the inaugural edition of the NFG Winter Newsletter.

This year we thought it would be a nice idea to keep botanical awareness alive (if not necessarily fully awake) within the group, even in the depths of the winter dormant period, by taking a quick look back at some of the more interesting moments from the 2015 botanising season. There is also a little prevue of some of the exciting things we have planned for you all in 2016 and a light scattering of other vaguely interesting bits and pieces.

Contributors to this edition are Suki Pryce, Janet Higgins, Bob Leaney, Mary Ghullam and myself, plus Richard Carter and Bob Ellis.

Feedback on the content, types of articles etc very welcome. If anyone would like to prepare something for the 2016-17 edition, or nominate a 'friend' to write something, I would be very pleased to hear from you.

Jo Parmenter

BEATING THE RECORDING BLUES

It's that time of year again! Flora Group has finished until the spring. There's this large hole in your life to fill. Whatever is to be done? Do not worry help is at hand!

There's this exciting, challenging activity – and (importantly) - it's free!!!!

Come and crawl on your hands and knees in the wind and pouring rain searching for Red Data Book species. Get torn and scratched by brambles and stung by nettles, while examining Sea Buckthorn twigs. Sink deep into bogs, while attempting to skip daintily from tussock to tussock in wet woodland. Ford deep ditches and slide down muddy banks in the pursuit of knowledge. Break the ice over shallow pools to source the treasures beneath. Perch shivering in the driving snow on slippery logs, while munching sandwiches. Run the gauntlet of rutting deer and roaring dinosaurs.

All this could be yours, if you join the Norfolk and Suffolk Bryological Group and enter the fascinating world of mosses and liverworts!

Fortunately, it was asleep at the time

Balloonwort

Smooth bristle-moss

Mary Ghullam

Who could possibly resist such an enticingly worded invitation…….if on the other hand (sorry; just couldn't help myself), you prefer your fingers and toes pink instead of blue, Richard has some other survey ideas - some of which can even be implemented from the relative comfort and safety of your own car. JP

BOTANISING IN WINTER

We always wonder whether there are species we under-record because they flower and disappear before Norfolk Flora Group traditionally gets going in late April or early May. So here are some suggestions for some things to look out for as you travel about the county.

The main thing that is much easier to see in winter (although it is still there in summer, just very difficult to spot), is *Viscum album* (Mistletoe). Lots of you do send in records, so thanks and keep up the good work. We think it may be on the increase in the county, so the data could prove very useful.

The next most obvious thing is the Snowdrops – look out for the less common species such as *Galanthus plicatus* (Pleated Snowdrop) as well as the more frequently found *Galanthus nivalis* (Common Snowdrop). Snowdrops have a lot in common with the other large genus of spring bulbs, the Daffodils (*Narcissus* species) in that there are a lot of cultivars, making identification difficult at the best of times, and impossible once flowering has finished – after April we only record '*Galanthus* agg.' or '*Narcissus* agg.' There are good keys to both genera written by Professor Mike Crawley (VCR for Berkshire) and available on the BSBI website. So how about having a go? As the ID is difficult perhaps get together with somebody else from NFG, and *always* take good photographs to support your record – or better still collect herbarium specimens. Remember that people tend to frequently plant these bulbs, so try to ensure that you only record 'naturalised' populations, which may have arisen from dumped garden waste, or spread out from a long-ago verge planting. People often tend to feel a degree of ownership for bulbs close to their homes, so please don't collect them from immediately outside somebody's house or village greenspaces.

It is a good time to record a few of the plants that flower before their leaves appear, especially the large Butterburs – we probably have mostly *Petasites hybridus* (Butterbur) in Norfolk, but it is sometimes hard to be sure from the leaves alone, and the flowers will allow you to distinguish it from the non-native species. Other plants like *Trachystemon* may be easier to spot in wild gardens from the flowers.

On a more mundane level, I find it hard to believe that there are many squares in Norfolk that lack *Ficaria verna* (Lesser Celandine), but we rather seldom record it on NFG meetings because it is one of the few plants that can disappear without trace by June; so just getting squares ticked off for Celandines would be really useful. Do not worry too much about the sub-species, as the axillary bulbils tend to become obvious only after flowering. *Anemone nemorosa* (Wood Anemone) and *Eranthis hyemalis* (Winter Aconite) are another two species which tend to have vanished by early summer.

Finally, for the brave, there are the early crucifers, especially *Erophila verna* (Common Whitlowgrass) and closely related species, which again we cannot distinguish from one another by the time NFG gets out into the field. Stace's Flora should be adequate, but Tim Rich has written a bit about them in various BSBI publications including the crucifer handbook (probably articles in *BSBI News* too). Likewise look out for the early flowering *Poa infirma* (Early Meadow-grass), which looks like feeble *Poa annua* (Annual Meadow-grass) with a yellowish-green hue and upswept inflorescence branches. It is spreading in southern England and has turned up in Norwich and Kings Lynn. Look for it in trampled places, car parks and the like (it often grows on compacted

ground under park trees). Also look out for *Stellaria pallida* (Lesser Chickweed), which looks like feeble *Stellaria media* (Common Chickweed), with no petals to speak of, and grows in straggly patches on free-draining and sometimes trampled soil – common in forestry plantations and on the coast, but doubtless elsewhere too.

There must be things I have failed to mention, but here at least is something to be going on with...

Richard Carter

2015 MEETINGS IN EAST NORFOLK

…… and now, by popular demand, here is one of our glorious leaders, Bob Ellis, with a brief summary of last year's VC27 meetings. You can almost feel the mosquitoes nibbling and hear the water sloshing about in your wellies. JP

There were 16 Flora Group field meetings held in east Norfolk (vice-county 27) in 2015 as well as a joint meeting at South Lopham Fen with both the Lowestoft Field Club and the Norfolk & Norwich Naturalists' Society, and a joint meeting (in the 'Wild Flowers Revealed' series) at NWT Hickling Broad, also with the NNNS. There were also two workshops held in the vice-county, which Janet has written about below.

A brief résumé of the 16 meetings is presented below, together with the number of records and species at each. The most significant factor affecting the diversity of species recorded on any one day is, of course, the variety of habitats visited; but the number of participants and groups, the time of year and the richness of the habitats all play their part.

Numbers of species and records are simple statistics to collect and present but the perceived quality of the records is far less tangible. This might be related to scarcity (and at different geographical scales), threat and decline (e.g. conservation status), native status, indication of quality habitats and so on but it still often comes down to a subjective assessment – what we (by experience) think of as particularly good plants to find.

I often find that picking a few species out of a few hundred to put into a report as rather invidious but as it might help to trigger a few memories, give a flavour of the meeting and perhaps lead to one or two interesting 'factoids', I don't think I can avoid it. If my choices fail to please, please forgive me.

Date	Location	Groups	Records	Species	Highlights
19/04	Norwich and suburbs	4	725	318	The party split into four groups; one looked at the Airport estate and the Hellesdon area, one at the Sprowston & Thorpe St Andrew area, a third at the Lakenham area and a fourth surveying the old power station site at Thorpe and then the south-eastern part of the city. Perhaps the most notable plant for the Hellesdon area was *Crassula tillaea* (Mossy Stonecrop), in rather bare and compacted roadside grass on light soil. Most groups saw plenty of *Saxifraga tridactylites* (Rue-leaved Saxifrage) and *Myosotis ramosissima* (Early Forget-me-not) and the old power station site had a strong population of *Inula conyzae* (Ploughman's spikenard). After returning to HQ, drinks and food were enjoyed at the Coach and Horses.
02/05	Costessey & Easton	3	631	297	The party split into three groups; one looked at the Costessey industrial and trading areas, a second surveyed the Longwater quarry and piece of woodland (a county wildlife site) and a third surveyed the Cemex quarry. The Costessey industrial estate provided an opportunity to admire a patch of *Poa infirma* (Early Meadow-grass) and a few plants of *Senecio inaequidens* (Narrow-leaved Ragwort), which has yet to colonise Norwich to the extent it has Great Yarmouth. The Longwater quarry group recorded *Barbarea verna* (American winter-cress) and *Sedum sexangulare* (Tasteless Stonecrop). Despite its English name the latter looks quite dapper. The party recombined after lunch to look at the capped landfill site and finally a few diehards went to Queen's Hills and Snakes Hills before repairing to the Marlingford Bell for refreshment.
07/05	Brooke & Howe	3	647	270	Clayland woods. Two groups surveyed Brooke Wood and a third ventured to a couple of county wildlife site woods nearby. One of the Brooke Wood groups found several spikes of *Platanthera chlorantha* (Greater Butterfly-orchid); probably the best of what was a very good ground flora that included frequent *Luzula pilosa* (Hairy Wood-rush) and *Succisa pratensis* (Devil's-bit Scabious). The discovery of patches of *Oenanthe crocata* (Hemlock Water-dropwort) in the middle of a broad ride, however, was possibly the oddest of the day. For the third group, Howe Grove yielded *Polystichum aculeatum* (Hard Shield-fern) and Creasy's Grove sported a patch of *Ranunculus auricomus* (Goldilocks Buttercup). The King's Head at Brooke provided post-survey refreshment and relaxation.
12/05	Hempnall & Woodton	2	539	229	More clayland woods. One group surveyed Spring Wood where the star attraction turned out to be *Genista tinctoria* (Dyer's Greenweed) at the edge of the airfield where it had been seen in 1992 by Alec Bull and prior to that by Peter Lambley. The second group visited Hempnall Little Wood where *Melica uniflora* (Wood Melick) was plentiful and

Date	Location	Groups	Records	Species	Highlights
					Ranunculus auricomus was again recorded and then Winter's Grove at Woodton to discover the likes of *Crataegus laevigata* (Midland Hawthorn) and *Milium effusum* (Wood Millet).
17/05	Raveningham	2	528	263	Another quarry. In the morning two groups surveyed the accessible parts of the Cemex quarry on Raveningham Estate. Of particular note was the abundance of *Hypochaeris glabra* (Smooth Cat's-ear), *Vulpia ciliata* (Bearded Fescue) and *Filago minima* (Small Cudweed). In the afternoon, our numbers diminished, we regrouped and surveyed two further parts of the estate with a focus on the woods. One group recorded a single spike of *Platanthera chlorantha* in George's wood together with *Neottia ovata* (Twayblade). *Orchis mascula* (Early Purple-orchid) was present in both these woods as well as in Raveningham Covert which was visited by the second group who also found *Carex leporina* (Oval Sedge) in Low Grounds.
23/05	Horstead	2	643	305	Yet another quarry. With limited time, two groups spent the morning at the Longwater quarry where *Anthriscus caucalis* (Bur Chervil) and *Descurainia sophia* (Flixweed) were quite frequent. The presence of *Equisetum telmateia* (Great Horsetail) was something of a surprise. After an early lunch we moved on to the capped landfill site nearby and regrouped. Here *Hirschfeldia incana* (Hoary Mustard) and *Polypogon monspeliensis* (Annual Beard-grass) were found. We regrouped once again to do a little tetrad-bashing before close of play and R&R at the Recruiting Sergeant in Horstead.
06/06	Arminghall & Caistor St Edmund	3	852	353	Even more clayland woods. One group spent the morning in Arminghall Wood where *Carex strigosa* (Thin-spiked Wood-sedge) was found in a damp area near the edge. This was one of the best finds of the year as it is only the second site for East Norfolk and only the third for the county as a whole since the 19th century. All the county Floras describe it as rare, though intriguingly it was reported from Arminghall in 1840 by R.J. Mann. A second group visited Foxes Grove and Long Plantation in Caistor St Edmund and a third went to Nemora Wood and Caistor Wood, which had a particularly nice ground flora including *Chrysosplenium oppositifolium* (Opposite-leaved Golden-saxifrage), *Euphorbia amygdaloides* subsp. *amygdaloides* (Wood Spurge) and *Melica uniflora* (Wood Melick). The list was supplemented by some tetrad bashing, which added *Catapodium rigidum* (Fern-grass), *Echium vulgare* (Viper's Bugloss) and *Silybum marianum* (Milk Thistle), all on the lighter soils in the area.
18/06	Alby & Thwaite	3	794	362	Alby Farms landholding. The arable land was divided between three groups with each doing a little bit of tetrad-bashing as well. One group recorded *Erysimum cheiranthoides* (Treacle Mustard) on the arable fields and *Dactylorhiza incarnata* subsp. *incarnata* (Early Marsh-Orchid) and *Oenanthe fistulosa* (Tubular Water-dropwort) at Thwaite Common; a second found *Atriplex hortensis* (Garden Orache) on a muck heap and *Sedum telephium* (Orpine) on a roadside bank and the third

Date	Location	Groups	Records	Species	Highlights
					encountered *Asplenium trichomanes* (Maidenhair Spleenwort) on Hanworth Common. Nothing spectacular but a good long list all the same, worthy of some refreshment at the Gunton Arms.
23/06	Marsham & Hevingham	3	930	360	RJ Crane landholding. Again the arable land was divided between three groups with each doing some tetrad-bashing as well. One surprise was Mike Padfield's sighting of *Isolepis setacea* (Bristle Club-rush) in the planting furrows of an otherwise unremarkable recent plantation on wet neutral grassland, perhaps indicating that this species might be more widespread than records suggest – it is very easy to overlook. *Lamium amplexicaule* (Henbit Dead-nettle) was seen several times by all three groups, mostly in arable but also in some abandoned allotments, which added *Misopates orontium* (Weasel's-snout), *Spergula arvensis* (Corn Spurrey) and *Stachys arvensis* (Field Woundwort) as well – ah, and *Lathyrus odoratus* (Sweet Pea).
07/07	Barton	2	753	199	One group spent the morning at the Barton Turf Adventure Centre then went on to the Barton Fen area in the afternoon. A second group surveyed Mill Marsh then visited a second part of the Barton Fen area. A number of rare and scarce wetland species were encountered. In all, 14 species of sedge were recorded including *Carex appropinquata* (Fibrous Tussock-sedge), *C. diandra* (Lesser Tussock-sedge) and *C. lasiocarpa* (Slender sedge); other notable species included *Blechnum spicant* (Hard Fern), *Eriophorum angustifolium* (Common Cotton-grass), *Osmunda regalis* (Royal Fern), *Pedicularis palustris* (Marsh Lousewort), *Schoenus nigricans* (Black Bog-rush), *Sium latifolium* (Greater Water-parsnip) and *Viola palustris* (Marsh Violet). A splendid day's Broadland botany.
18/07	Hoveton	1	482	261	Hoveton Estate. For once, the party remained as a single group. At the edges of the fen and marshes, *Cicuta virosa* (Cowbane) proved to be quite frequent and although in the morning the going was quite tough, a good number of wetland species were recorded. Other parts of the estate added further variety and although nothing else particularly stood out it was a very rewarding excursion.
25/07	Trinity Broads	2	769	336	One group spent much of their time at Hall Farm fen, much of which is an SSSI, seeking out the likes of *Baldellia ranunculoides* (Lesser water-plantain), *Carex echinata* (Star Sedge), *C. lepidocarpa* (Long-stalked Yellow-sedge), *Eleogiton fluitans* (Floating Club-rush) and *Oenanthe fistulosa (Tubular Water-dropwort)*. They then visited Hall Close on the edge of Ormesby Little Broad, which was notable for a large stand of *Taxodium distichum* (Swamp Cypress). A second group couldn't tear themselves away from the waterworks site, which had a surprisingly heathy flora including of *Aira praecox* (Early Hair Grass), *Erica cinerea* (Bell Heather) – a first record for the 10Km square, *Galium saxatile* (Heath Bedstraw) – a second for the 10Km square, *Hypericum humifusum* (), *H. pulchrum* and so on. Another splendid day's Broadland botany.

Date	Location	Groups	Records	Species	Highlights
27/08	Diss	3	620	362	A late season to visit to Diss and surrounds, somewhat of a follow up to the one in April 2014. Many alien species were found and, as befits Arthur Copping's stamping ground, several of these were grasses, including *Anemanthele lessoniana* (New Zealand Wind-grass), *Digitaria sanguinalis* (Hairy Finger-grass), *Echinochloa crus-galli* (Cockspur), *Panicum miliaceum* (Common Millet), *Polypogon viridis* (Water Bent), *Setaria pumila* (Yellow Bristle-grass) and *Nassella tenuissima* (Argentine Needle-grass). It is particular pleasing that *Genista tinctoria* (Dyer's Greenweed) was found on Roydon Common where it had been absent for several years.
05/09	Halvergate marshes	3	694	192	When visiting the grazing marshes, the botanist's focus is usually on the dykes and ditches and their margins. This excursion was no exception. As one gets closer to the sea, a somewhat brackish influence becomes apparent and this was indicated here by the presence of *Bolboschoenus maritimus* (Sea Club-rush) and *Juncus gerardii* (Saltmarsh Rush). 'Good' freshwater species, however, were found, including *Butomus umbellatus* (Flowering-rush), *Hippuris vulgaris* (Mare's-tail), *Oenanthe fistulosa* (Tubular Water-dropwort) – which was widespread in the area, *Samolus valerandi* (Brookweed) and *Triglochin palustre* (Marsh Arrowgrass). The alien *Lemna turionifera* (Red Duckweed) was found for the fifth time in the vice-county, and for the first time in this 10Km square.
12/09	Limpenhoe & Reedham marshes	3	641	218	It was a great pleasure to be allowed to survey Limpenhoe Meadows SSSI and the surrounding grazing marshes. Amongst other delights, the SSSI yielded *Drosera rotundifolia* (Round-leaved Sundew) – this is the only known site in this 10Km square and in the whole of the Yare valley. *Pedicularis palustris* (Marsh Lousewort) was also seen – and possibly *P. sylvatica* (Lousewort) but that needs to be checked earlier in the season. *Anagallis tenella* (Bog Pimpernel) was present here and it was also found in one area at the 'upland' edge of the marshes. Elsewhere in the grazing marshes *Bidens cernua* (Nodding Bur-marigold), *Myriophyllum verticillatum* (Whorled Water-milfoil), *Potamogeton friesii* (Flat-stalked Pondweed), *Ranunculus circinatus* (Fan-leaved Water-crowfoot) and *Stratiotes aloides* (Water-soldier) were amongst the many species recorded.
03/10	Wramplingham etc.	2	588	303	Tetrad bashing in the Wymondham area. At the edges of arable fields several interesting species were recorded including *Amaranthus bouchonii* (Indehiscent Amaranth), *Bromus secalinus* (Rye Brome) – a species that that appears to be increasing in range, *Euphorbia exigua* (Dwarf Spurge) and *Silene noctiflora* (Night-flowering Catchfly) whilst on the roadside verges, *Leontodon hispidus* (Rough Hawkbit), *Pimpinella saxifraga* (Burnet-saxifrage) – which was quite widespread and *Plantago media* (Hoary Plantain) were seen. The excursion certainly helped fill a gap in the records and the Cock Inn at Barford helped to quench a thirst.

Sincere thanks go to all the landowners who gave us permission to botanise on their property and all those who helped facilitate such access – Jo Parmenter (the prime suspect), but also Sam Brown, Eilish Rothney and Debs Kershaw of the Norfolk Wildlife Trust, Katherine Trehane, Adrian Gardner, Chris Bielby and Emily Swann of Natural England, Simon Smith of Longwater Gravel, Mark Johnson of CEMEX, Stuart Bailey of the NCC Closed Landfill Team and Jake Fiennes of the Raveningham Estate.

Thanks also to those all those who filled in record cards and effectively led groups, Jo again of course, but also Mary Ghullam, Chris Roberts, Frances Schumann….

Bob Ellis

A STRANGE ALLURE – RECORDING WITH THE NFG

Hickling Broad 2nd August 2015 – a joint meeting between the Norfolk Flora Group and the Norfolk and Norwich Naturalists Society, and Jo Parmenter of the NFG has spent most of her day in school-mistress mode explaining the flora and its ecology to a bunch of keen but mostly far less knowledgeable people than herself. When her instructress stint is finally over, and her audience has left for the Tea Rooms, she heaves a big sigh and exclaims 'Thank God for that – I'm desperate to do some recording!' And the strange thing is that I know just how she feels …. the peculiar allure of recording has crept up on me too during my short stint with the Norfolk Flora Group.

My introduction to the Group's work began last year on 21st June 2014, and was something of a baptism of fire. A keen amateur botanist, I rocked up to the meeting at Dilham Broad Fen on a hot day, in sandals, under the sadly mistaken impression that an NFG session involved a couple of hours of genteel botanising, then back to one's car for lunch, and a couple more hours recording in the afternoon. My first mistake was the sandals - I'd successfully negotiated Upton Fen and Cockshoot Broad in them the previous week, but NFG members hinted that they might not be quite up to the job on this occasion. Luckily I had wellies in my car and could take their advice ….. thank God I did.

Alas, for some reason at this stage, no-one disabused me of my other notion that we'd be returning to civilisation for lunch – so I was foodless several hours later when we were in the middle of a wild boggy fen, un-navigable except by experts, and miles from our cars. My companions were mostly older than me, but seemed unfazed by the relentless walking in the heat, and the fact that there was nowhere to sit down (I was weary by now and longed to find somewhere to rest for a moment). When they weren't walking they were bending over some obscure sedge and discussing its finer points.

We did finally stop for lunch, and I got to park myself on a soggy tussock; and now – too late – they told me about NFG Rule No.1 ('always carry your lunch with you'). Some kindly shared their crisps and sandwiches with me, and then we continued through the trackless bog for another few hours. "Is this really for me??" I now had to ask myself; and in describing the experience to friends later, I could really only summarise it as "hardcore". But, yes - also strangely addictive. I had learnt so much on that first outing (at least 17 forbs I'd never knowingly seen before), and was soon back for more – now more appropriately shod, and with my lunch on my back.

This year (2015) has only increased the appeal of recording for me. I think it has different attractions for different people, but in my case it includes the hunter-gatherer pleasure of 'spotting ones prey'; the competitive kick of being the first to spy something new for the day, and also (if one's on form) of naming it correctly. Then there's the delight of being in new, out-of-the-way, and often very unspoilt places; and of having access to 'forbidden', dangerous or inaccessible ones - quarries, landfill sites, private estates. But what makes the whole enterprise thoroughly worthwhile is the 'citizen science' aspect – the knowledge that one's contributing enduring data to a valuable end product. And, finally, of course, there's the people: most NFG members are so unassuming but so marvellously knowledgeable - yet still happy to share their knowledge with the less expert. It's this access to expertise that made me decide this year that I *would* try to master the graminoids – something that I'd largely given up on when botanising alone.

Some highlights of the 2015 NFG season for me have been: abundant Grass Vetchling (*Lathyrus nissolia*) at Heacham. Shoreweed (*Litorella uniflora*) at STANTA (I barely knew it existed). Fringed Water-lily (*Nymphoides peltata*) and mating Hornet Moths at Oxburgh Hall. Carpets of Knotted Pearlwort (*Sagina nodosa*), plus a Great Egret and a Slow-worm, at Oxburgh Lakes. A feast of fen specialities at Hickling Broad. The dreamy un-peopled 'between two rivers' experience of Hockwold, with Thornapple (*Datura stramonium*) in a farmyard, more *Sagina nodosa* on a river bank, and Large-flowered Hemp-nettle (*Galeopsis speciosa*) in abundance in roadside ditches. Common Meadow-rue (*Thalictrum flavum*) at Northwold, plus the once-in-a-lifetime riverside display of Henbane (*Hyoscyamus niger*), which I missed on the day but took a special pilgrimage back to see later. Rustyback Fern (*Ceterach officinarum*) on an old engineering-brick bridge in King's Lynn's urban fringe. Marsh Arrowgrass (*Triglochin palustre*) galore at Halvergate Marshes, plus two Grass Snakes, a Barn Owl, and a surreal view of black cattle on a bund silhouetted against a lowering sky with industrial Yarmouth beyond. The latest 'must-see' Conyza at Outwell (*Conyza bilboana*). And a host of new-to-me grasses, rushes and sedges.

Last but not least there's the fine people of NFG – their knowledge, their kindness, and their keenness to go to the pub! I salute you!

Suki Pryce

THE NORFOLK HERBARIUM 'GRIDDING' PROJECT

This article was first published in a 2015 edition of Natterjack, but those non-NNNS members amongst you may find it vaguely interesting. My apologies for boring the rest of you! JP

Our Norfolk County Herbarium is housed at Norwich Castle Study Centre. For those not familiar with herbaria, plant specimens are attached to a sheet of paper, so as to show the various parts of each plant; leaves, flowers, roots, etc. to best effect. The sheets of paper also detail each plant's scientific name (as it was at the time of collection), together with the date and place of field collection, and sometimes notes on the habitat from which the specimen was collected. More recent specimens also have grid references. The sheets of paper are arranged into folders and the whole collection is typically arranged according to the rules of taxonomy.

The Kew website describes a herbarium as 'a collection of preserved plants stored, catalogued, and arranged systematically for study by professionals and amateurs from many walks of life', but this description does not do it justice: a herbarium has a very wide and varied number of possible uses (someone at the Smithsonian has come up with 72, and doubtless more will emerge with the passage of time). There are probably 20 or so truly fundamental reasons for maintaining national and county herbaria, but to my mind, some of the most important are to:

- discover or confirm the identity of a plant;
- provide material for making morphological measurements and data for revisions and monographs
- provide location data for planning field trips
- serve as a secure repository for "type" specimens
- provide material for DNA analysis
- record historical biodiversity and provide information on species which are now rare, scarce or extinct species
- provide information which may be used in comparative studies in plant distribution
- provide context and an evidence base for publications, including county floras
- provide material for teaching
- promote appreciation of botanical diversity by making specimens available for viewing by students, researchers, and the public.
- provide information on 'lost' sites or habitats which may be helpful in undertaking or prioritising habitat restoration work
- provide information on other species, e.g. invertebrates or diatoms inadvertently collected along with the plant
- provide information on the collectors themselves: who were they, where did they live and what motivated them: information which may be useful for researchers in other fields such as social historians

The County Herbarium contains an enormous amount of plant material: there are over 12,500 sheets for species collected from Norfolk alone. The Herbarium has until recently been relatively inaccessible to the public, however over the past 10 years or so, a series of dedicated volunteers and staff, notably Hatty Aldridge, Gillian Beckett, Chris Roberts, Colin Dunster, Bob Leaney and Tony Irwin, have been systematically working their way through the collection, checking identifications for some of the more taxonomically challenging specimens, re-mounting material where it has become unstable, and gradually collating all of the material held into a series of folders in which species are ordered taxonomically, each identified by the name of the species as it appears in the 2nd edition of Stace and Kent's List of Vascular Plants of the British Isles and its supplement. These are stored in the herbarium store room at Norwich Castle Study Centre,

and may be viewed by appointment. Further volunteers have entered the data given on each herbarium sheet into a digital catalogue, with the long-term aim of creating a searchable digital resource; and thus the collections have been much improved as a reference resource.

Polystichum aculeatum
Geldart collection. Collected in Dereham.
Undated, likely mid-late 19th century.

Primula veris
Collected at Carleton Rode and Oby,
by Miss E Davie in 1887.

The Norfolk Herbarium includes around 1600 specimens from the Geldart Collection, which was collected in the latter half of the 19th century from locations throughout the UK, together with a few specimens from further afield. Herbert Geldart (1831-1902) was a member of the Norfolk and Norwich Naturalist Society from its inception, and served as its President on a number of occasions during the late 19th century. Many of his papers, mostly on aspects of Norfolk botany are published in The Transactions of the Society. Geldart collected most of the specimens himself, although the collection also benefited by around 500 specimens when Geldart was bequeathed the herbarium of his friend Hampden Glasspoole (1825-1887), a botanist from Ormesby, in east Norfolk, who put together a herbarium of specimens which include a large number from Gt Yarmouth and the eastern Norfolk Broads. Further material was provided to Geldart by other eminent botanists, including Sir William Hooker, Sir Joseph Hooker and Sir James Paget; and substantial numbers of specimens were also supplied by Arthur Bennett, Dr Frederick Long, Robert Wigham, Rev. James Brown, J.W. Ewing, Rev. W. Linton, F. Mackie and John Syme. The collection put together by Herbert Geldart was augmented after his death by his daughter Alice, who subsequently donated the collection to Norwich Castle Museum.

Other important collections within the Norfolk County Herbarium are summarised below, and include the herbaria of Eric Swann, who, with C P Petch, published the 1968 'Flora of Norfolk', which he wrote over a 20 year period and William Nicholson, who spent over thirty years writing and editing the 1914 'Flora of Norfolk'. Material collected by Kirby Trimmer, who published the earliest Flora of Norfolk in 1866, is also contained within the Herbarium.

Collector	Date range of collection	Number of specimens	Other
Edith Davie (1870s-c1939)	1874-1925	764	Mainly collected in East Norfolk and especially Flegg; a clergyman's daughter, many early specimens were obtained close to the churches and rectories her father visited.
Frederick Long (1840-1927)	1843-1930	2229	Practised as a doctor in Wells-next-the-Sea until 1899, when he retired to Norwich.
John Drew Salmon (1802–1859)	1808-1888	3464	Spent his early working life in Thetford, at which time he collected Breckland flora.
Herbert D. Geldart (1831–1902)	1799-1913	7445	
Philip Rumbelow (1879–1954)	1830-1949	619	A Yarmouth naturalist, he collected most of the specimens himself
Hampden G Glasspoole (1825-1887)			A botanist from Ormesby, Norfolk who put together a herbarium of specimens from southern England and the environs of Great Yarmouth and the eastern Norfolk Broads.
Eric Swann (1904-1989)	1875-1989	5768	An amateur botanist, Swann worked as a bank clerk in King's Lynn.
William A. Nicholson (1858–1935)	1850-1926	128	Worked for Gurney's Bank in Norwich
Francis H Barclay(1870-1935)	1866-1916	636	Lived in Cromer for most of his life and was a member of a well-established Norfolk family
Alice Geldart (1862–1942)	1880s-1910s		Was interested in the history of botany and the biographies of famous national botanists and their Norfolk contemporaries
Frederick Robinson	1846-1930	868	Member of a Watton family of solicitors, he was an eminent Norfolk botanist. Collected most commonly in Norfolk (and especially Breckland) and found a number of plants around Watton that were new to Norfolk.

As an ecologist and landscape archaeologist, the herbarium, for me, brings the past alive. I can read through lists of species collected at lost sites, such as Ormesby Common, a tract of wet mire and heathland, which is thought to have been located at the site of the present day waterworks, and visualise how it might have appeared to Hampden Glasspoole when he collected his specimens, which included bog pimpernel, water purslane, marsh gentian and *Carex trinervis*. Incidentally, Ormesby Common was the only known UK site for this last species, which typically grows in wet dune slacks, and without the specimens which reside in our museum, there would be no incontrovertible evidence for its presence in the country.

Last autumn, in a fit of enthusiasm sparked by a throwaway remark by Bob Ellis (must try to curb these impulses), I embarked on a project to determine a grid reference for all of the locations from which herbarium specimens have been collected in East Norfolk, ably assisted by Hatty Aldridge, with sporadic input from Bob Leaney.

My aspiration is to identify sites to the monad (1km x 1km) level, but, given that locations are often described only by the parish in which they fall, and, bearing in mind that the 1850s collector

would not have had the same map resources which are available to us and could actually have been plant hunting across the boundary in the next parish without even realising it, identification to a tetrad or even hectad (10km square), is perhaps a more realistic goal. However, there are other little bits and pieces of evidence which can be used to pinpoint the location more reliably that one might first imagine. Even seemingly casual remarks on the herbarium sheet can turn out to be useful. For example, goldilocks buttercup was collected by Mr S T Taylor from 'near Mr Barnard's' in Bracon Ash, in 1859. A little research revealed that at that date, Mr Barnard resided at Mergate Hall, which turns out to be immediately to the south of the hamlet. 'Near Thorpe Asylum' proved more problematic, as the site of the asylum is bisected by a tetrad boundary, so I still have no idea whether the record was from TG20U or TG20Z.

By factoring in other variables, such as "What soil types does the species need?", "What sort of habitats does the plant grow in", "Where might such habitats have been found in that locality at the time when the specimen was collected", and even "What do we know about the collector, and their typical haunts" more information can be inferred as to the probable location of the plant. This is where it gets really interesting, as I have to cross reference what we know about the ecology of the plant with the local geology, geomorphology, soils and hydrology, and also the landscape/habitats present at the time it was recorded, in order to establish the most likely location of the record.

Parliamentary Enclosure led to a complete restructuring of the Norfolk landscape. Vast tracts of common wetland and heathland were enclosed and drained or otherwise improved, thus changing the countryside beyond recognition. Nearly 85% of the area of the unimproved commons was lost over a hundred year period between 1796 and 1891. When assigning grid references to the early herbarium specimens, it is therefore important to be wary of making erroneous assumptions about sites. For example, pre and immediately post enclosure, there was a lot more semi-natural habitat in the county than there is today, and if you, for example, have a rare bog sedge which is today only found at Smallburgh Fen, it is dangerous to assume that old records of that species would also have come from Smallburgh Fen. For pre1850s records (the wet common in this area was enclosed in the 1820s, but would have proven difficult to effectively drain), the plant could conceivably have been collected from anywhere between Smallburgh Fen and Wayford Bridge.

I am finding St Faith's Bog, which once supported all three species of *Drosera*, particularly challenging, although since this article was first published, Alec Bull was kind enough to share his theories as to its location with me. St Faith's was part of a larger tract of mire and heath which extended across to Felthorpe, and was a popular site with 19th century botanists, with collecting of bog and mire plant species mainly being carried out in the 1830s and early 1840s, which may suggest that the site was lost soon after, presumably to enclosure and land drainage. Felthorpe was enclosed at a relatively early date, in 1779, which tends to suggest that St Faith's bog was on the Newton St Faith side of the parish boundary. I believe that it would have been located on the poorly drained stagnogley podzols of the Felthorpe Association and in all likelihood somewhere around the headwaters of the Spixworth Beck. Much of this area has of course been drained for forestry and agricultural use. If anyone has any ideas as to its location, I would be delighted to hear from you. I can be contacted on jo.parmenter@tlp.uk.com or 07710 252468.

Jo Parmenter

NFG TRAINING EVENTS 2015

Janet very kindly agreed to do a brief report on a couple of the exciting and informative training events which were held in 2015. JP

Epilobium & Oenothera workshop (Wheatfen study centre, August)

The workshop began ominously, promising a day of books and specimens with little chance of botanising our surroundings at Wheatfen! However, Bob Ellis soon fascinated us with an introduction to the unique reproductive system of *Oenothera* (Evening-primrose), which are functionally asexual despite undergoing meiosis, resulting in a range of distinct genotypes much like apomixes. The size and shape of the petals, red colouration of the sepals and the red bulbous-based hairs are all important characters used to separate the species. *Oenothera biennis* (Common Evening-primrose) has its style and filaments at the same level, whereas *O. glazioviana* (Large-flowered Evening-primrose) holds its style well above its filaments. Two distinct hybrids of *O. x fallax* (Intermediate Evening-primrose) are formed, depending on which species is the female parent. Some people had also brought along the garden variety, *O. stricta* (Fragrant Evening-primrose), which is easily distinguished by its long narrow leaves and its capsule being widest near the apex.

Our hard work in the morning was rewarded at lunchtime with a break from the classroom and a chance to get out in the field! We got a sneak preview of the afternoon that lay ahead of us with a pleasurable walk around Wheatfen. We saw many examples of *Epilobium hirsutum* (Great Willowherb) and *E. parviflorum* (Hoary Willowherb) and possibly their hybrid *E. x subhirsutum*. When we got back Bob Leaney spent the afternoon talking us through his very own 'Bob Leaney Visual Key' to Norfolk willowherbs which I found to be extremely informative (although I'm not sure how he manages to fit so much information on one sheet of paper!). The key started with the shape of the stigma, followed by a range of leaf and stem characteristics, then finally checking the indumentum (type of hairiness) of the pod and floral collar, especially noting the presence of glandular hairs. It all looked very simple on paper, but nature is not quite so simple with many plants showing a confusing mixture of characteristics. Even so, I now feel more confident tackling the identification of this difficult genus and I welcomed the opportunity to view some of the features under the microscope. I was also able to see *E. roseum* (Pale Willowherb) for the first time as this is not commonly found in Norfolk. Many of the willowherbs occasionally have white flowers but this is more common in *E. roseum*, which explained the presence of white flowers on the specimen I observed.

Thank you to Bob Ellis and Bob Leaney for an interesting and informative day and to Wheatfen for hosting us. I am now ready to seek out Willowherbs in my local patch and to find the Evening-primrose I had cycled past the day before.

Pteridophyte workshop (Norwich Museum Study Centre, October)

I found my way to the Norwich Castle Study Centre and realised that the last time I had been in the building was to visit my mother who had worked there when it was the Norwich probation office. After signing in, I was escorted through the maze of corridors, passing many interesting specimens on the way, to the study room where a small crowd had gathered! Somehow we managed to fit everyone around the large table in the natural history study room, a fascinating room filled with specimens and a great opportunity to go behind the scenes at the Norwich Castle Museum. Bob Ellis started with an informal presentation on the six species of *Equisetum* (Horsetails) found in Norfolk. I was familiar with four of these, *E. palustre, E. telmateia*, *E. arvense* and *E. fluviatile*. In addition, we had recorded *Equisetum x litorale* (Shore Horsetail), the hybrid between *E. arvense* and *E. fluviatile* at Garboldisham. We learnt about a range characteristics which are useful for identification such as the presence of an apical cone on either green summer stems or on separate fertile stems in spring and the cross-section of the stem, especially noting the diameter of the cavity. Bob Ellis stressed the importance of the cross-section of the side arm as a reliable characteristic used to distinguish between the species, especially for *E. arvense,* which can be highly variable depending on the habitat.

Next, I had an opportunity to get to grips with the thirty-three species of Norfolk ferns, eighteen of which I have encountered on my trips out with the Norfolk flora group. Bob Ellis gave a detailed presentation on the ferns, with additional snippets provided by Bob Leaney. We then worked in groups to try and identify some specimens using the 'short key to ferns of Norfolk' (adapted from Ken Adam's key for Essex), using characteristics such as the degree division of the frond and habit (a feature of rhizome length). Having fertile fronds was important so we could look at the position and shape of the sori and characteristics of the indusium. Separating *Polypodium vulgare* (Common Polypody) and *P. interjectum* (Intermediate Polypody) required looking down the microscope (x40) at the annulus of sporangium and counting the number of thick walled cells. I had brought along a specimen of a large scaly male fern collected at the Garboldisham meeting a few weeks earlier and carefully pressed in many sections. This was recorded as *Dryopteris affinis*, although it was difficult to distinguish from *D. borreri*, which is smaller with the rachis moderately rather than densely clothed with golden brown scales.

Then for our final treat, we took a look at a few of the 50,000 herbarium specimens of vascular plants held at the museum. Tony Irwin, Curator of Natural History, explained best practice for careful handling of these valuable, delicate specimens. It was splendid to see some ferns which I am unlikely to come across in the wild such as *Pilularia globulifera* (Pillwort), *Dryopteris cristata* (Crested Buckler-fern), *Ophioglossum vulgatum* (Adder's-tongue Fern) and *Botrychium lunaria* (Moonwort).

Janet Higgins

A SPECIAL REQUEST…..

Survey of Holme Dunes: could anyone who'd like to help update the NWT records database for this super site in 2016 please contact Suki Pryce: 01263 510292; sukipryce@hotmail.co.uk

VEGETATIVE IDENTIFICATION OF SMALL GERANIUM SPECIES

This article was first published in 'BSBI News' (BSBI News 99:22-28). Although I often mock BobL's preoccupation with hairs (sorry Bob), it has genuinely proved invaluable to me over the past year or so, and so I think bears reproducing here. JP

Whilst out tetrad recording or doing other survey work it is common to have to try and identify geranium species that are not in flower. The leaves of *Geranium robertianum* (Herb-Robert) are nearly always unmistakable and poorly grown specimens can easily be confirmed by the typical musky smell[1]. All the other small lowland species can be confused. Of the seven commonly encountered, only one, *G. pyrenaicum* (Hedgerow Crane's-bill) is perennial, but the six annual species; *G. rotundifolium* (Round-leaved Crane's-bill), *G. columbinum* (Long-stalked Crane's-bill), *G. dissectum* (Cut-leaved Crane's-bill), *G. molle* (Dove's-foot Crane's-bill) , *G. pusillum* (Small-flowered Crane's-bill & *G. lucidum* (Shining Crane's-bill), all produce overwintering basal leaves and flower mainly between May and July. Furthermore 'next seasons' rosettes of leaves can already be well developed by August, so that vegetative identification is possible for nine months of the year.

Good illustrations of the basal leaves of these species are widely available, notably in Clapham, Tutin and Warburg, the BSBI Plant Crib 1998, and in Stella Ross-Craig. However, leaf shape and dissection are the only features illustrated in line drawings and are very variable. I have become convinced over the last few seasons of taking an interest in this matter that the petiole hairs can virtually always be used, in addition to leaf shape, to achieve a reliable identification, although even then, and with extra features like leaf size, texture and colour, there are perhaps around 5% of individuals that cannot be identified when not in flower.

Although *G. dissectum* can be distinct in leaf shape when leaves are typical, with narrow divergent segments and dissection to about 7/8^{ths}, such leaves should only be assumed to be of this species on arable, garden, or waste ground sites - on chalky soils *G. columbinum* should be checked for by looking at petiole hairs. Furthermore, basal leaves of *G. dissectum* early in their growth may have wide, more contiguous segments with dissection only to around 2/3rd and can look like several other species, especially *G. pusillum. G. lucidum* can also be quite distinct on leaf characters, but it is usually a scarce species and it only takes a second or two to check that the petioles are glabrous or near-glabrous - all other species have profuse hairs of some sort or other.

Basically it makes sense to check petiole hairs in every case. The problem is that there seem to be no good illustrations readily available. Those in Stella Ross-Craig are entirely misleading and should be disregarded. Good descriptions are found in Clapham, Tutin and Warburg and in the Plant Crib, but descriptions do not 'stick in the mind' like illustrations, while just using the terms 'short medium and long', or 'glandular' and 'eglandular', does not adequately define the different hair types - even with some simplification eight types can be described (see below).

Over the last two seasons I have drawn the petiole hairs of all the species above. All drawings were done with a dissecting microscope using 10-20x power, and at least ten of most species were drawn, selecting any obvious variants as well as typical specimens. In the case of *G. columbinum* and *G. lucidum,* only two colonies were found. Those petioles chosen for illustration were often from colonies well known to me and identified using floral characters, or from colonies with very typical leaf characters, and all were from basal leaves before flowering or very early in the

[1] One of those few occasions where even BobL is prepared to concede that smell can be a useful character!

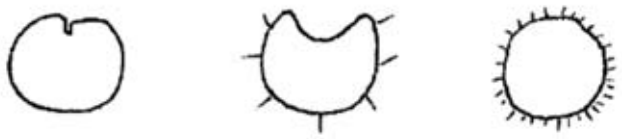
flowering period. The hairs on petioles of stem leaves, or on flowering stems, are often very different, and floral characters should chiefly be relied on when available.

Hopefully these illustrations will prove useful in the field, perhaps photocopied and pasted into the favourite field flora. For completeness I include some observations on other vegetative characters I have noted, and some general points on vegetative identification.

General points on vegetative identification of Geranium species

Identification to family and genus usually presents no problems with *Geranium,* but occasional difficulties might occur. Perhaps most commonly the larger geranium species (not dealt with here otherwise) might be confused at the rosette stage with *Ranunculus acris* (Meadow Buttercup): *G. pratense* (Meadow Crane's-bill), *G. sylvaticum* (Wood Crane's-bill) and *G. endressii* (French Crane's-bill) especially can look like this species. *Ranunculus acris*, however, has characteristic expanded flattened bases to its basal petioles, and these like all *Ranunculus* petioles have a single groove along their upper side not present in *Geranium* species. *G. columbinum* might be mistaken early in the season for *Malva moschata* (Musk Mallow), which often grows on similar calcareous soils, and which is a very variable plant, sometimes producing leaves similar to *G. columbinum* even early in the rosette stage. The mallow is usually, however, a more robust plant with patent rather than appressed hairs on the petioles and especially on the basal stems, and there are always likely to be a few of the typical simple reniform basal leaves low down. The petioles of *Malva moschata* are also deeply channelled above, and the basal stems ridged or furrowed. *Geranium* stems and petioles are always perfectly circular in cross-section.

Basic petiole cross sections



Ranunculus sp. *Malva moschata* *Geranium* sp.

With identification to species the illustrations of leaf characters mentioned above can be used, but various other leaf characters not shown in line drawings can also be useful. Leaf colour and texture can be especially helpful, for instance the dull, dark green and rather leathery leaves of *G. pyrenaicum*, the fresh pale-green delicately textured leaves of *G. pusillum*, the thick shiny late leaves of *G. dissectum*, and the rather pale grey-green leaves of *G. rotundifolium*. However, these characters can vary with season and age, as well as with soil type and light conditions - the leaves of *G. rotundifolium* might for instance be more dark green in shade. Number and size of leaves is also useful, as is 'habit". Plants of the perennial *G. pyrenaicum* in spring tends to produce just a few large sprawling leaves, in contrast to the similar sized, but greyer, overwintering leaves *of G. rotundifolium,* which tend to be more profuse and more often held up on ascending petioles. The other species usually have smaller leaves on average than these two. Very tiny procumbent rosettes of leaves with deep wine-red petioles, on poor soils, usually tum out to be *G. molle.*

These leaf features are best used as 'spotting characters' during survey work, identification being confirmed by leaf dissection and petiole hairs. Over the last two years I have looked at the leaf characters and basal petiole hairs of plants in flower, to try and see which better correlated with the floral identification, and there can be no doubt that petiole hairs are more reliable if

properly used. Leaf characters fairly frequently do not distinguish *G. pusillum* from G. *molle* or *G. dissectum* early in the year, and less often there can be overlap in characters between *G. pyrenaicum, G. rotundifolium* and (large) *G. molle*. Plainly there is a possibility also of mistaking late deeply dissected basal leaves of *G. dissectum* for those of *G. columbinum*. On the other hand petiole hairs, though quite variable, rarely show overlap of features as long as one is quite clear about what types of hairs are present in any one specimen. Each species has anything from 1 to 4 types of hairs which vary greatly in proportion, but the types of hairs present are almost invariable. Eight hair types can be defined:

1	2	3	4	5	6	7	8
							
SHORT GLANDULAR HAIRS	VERY SHORT BRUSH-LIKE EGLANDULAR HAIRS	SHORT EGLANDULAR HAIRS	DEFLEXED MEDIUM EGLANDULAR HAIRS	APPRESSED SWOLLEN POINTED HAIRS	MEDIUM GLANDULAR HAIRS	LONG BRISTLY HAIRS	VERY LONG WISPY HAIRS
May be present in all spp except G. columbinum. Diagnostic of G. lucidum if sole hair type.	Present in G. pyrenaicum & G. pusillum. Diagnostic of G. pusillum if sole hair type (apart from 1)	Present only in G. molle.	Hairs directed downwards. Diagnostic of G. dissectum	Diagnostic of G. columbinum	Diagnostic of G. rotundifolium (overwintering leaves may lack glandular tips)	Present in G. pyrenaicum & G. molle. Diagnostic of G. pyrenaicum if present with Type 2 hairs only	Diagnostic of G. molle

The very short glandular hairs (1) are never diagnostic unless occurring in the absence of other hair types, can be very sparse, and are often very difficult to spot even with a x20 lens, so are usually best ignored. When looking at petiole hairs it is best, anyway, to use a x10 lens, otherwise one of the hair types may be missed by looking at too short a length of stem - for instance the long bristly hairs (7) of *G. pyrenaicum* can be very sparse, but seem always to be present if one looks at a sufficient length of stem. Again a x 10 lens enables the length of the hairs relative to the stem width to be ascertained, a very important feature - however, it should be realised that the relative length of the hairs gets greater as petiole width decreases - so that the short brush-like eglandular hairs (2) of *G. pusillum* might be mistaken for the medium long eglandular hairs of *G. dissectum* (4) on a very narrow petiole.

In around 5% of cases, variants occur which can make identification difficult or impossible. For example, the very long wispy hairs (8) diagnostic of *G. molle* can be absent, and on occasions the short 'brush-like' hairs of uniform length (2) found in *G. pusillum* can be of irregular length or mixed with an occasional single medium short hair. Again, the medium-length glandular hairs *of G. rotundifolium* (6) are quite frequently absent, especially late in the year and through the winter, being replaced by eglandular hairs of the same length. With experience, identification might still be possible with these variants, especially if leaf characters are very typical. More frequently variations just involve the proportion of the various hair types, and here identification should be possible if a sufficient length of petiole is examined.

When a lens is available, petiole hairs are best examined in the field. After only an hour or two glands can shrivel and longer, patent hairs can become curved and deflexed causing problems with identification.

Vegetative characters of each species

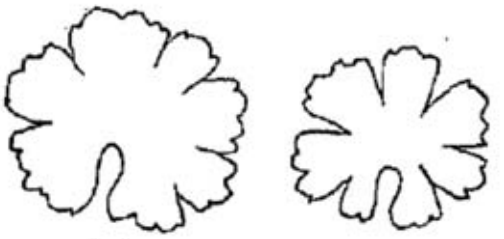
In the following descriptions 'spotting features' are given first, then leaf characters, and finally petiole hairs are described. Drawings of some of the common leaf variants are given, but it is vital to realise that a guess as to the species based on spotting characters and leaf features turns out to be wrong on checking petiole hairs in around a third of cases. The drawings in the Plant Crib give an idea of just how variable leaf shape can be.

1. **Geranium lucidum** leaves are usually characteristically shiny, bright green and rather simple in shape, each lobe being only shallowly dissected and rather square-looking in outline. The petioles and leaves sometimes develop a crimson colour later in growth. Dissection is usually to 1/4 - 1/2.

   The petioles are glabrous or very sparsely pubescent, whereas in all other species they are closely covered with one sort of hair or another. It appears that there are always some very short glandular hairs on the distal centimetre or so of the petiole. There are two diagnostic features which have perhaps not been noted before - a markedly rounded leaf sinus is present in many, but not all, cases, and the shiny upper leaf surface has long patent bristly hairs, with the under surface being glabrous and mat greyish-green. Other species may have hairs on both surfaces, but those on the upper surface are not as strictly patent or conspicuous as in *G. lucidum*.

Geranium lucidum

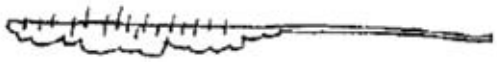
Leaf shape



X1

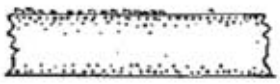
X2

Leaf surface hair type

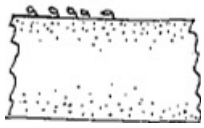


X1.5

Petiole hair type 1 (distal 1-2cm only)



X10



X20

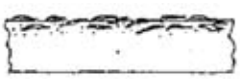
2. **Geranium columbinum** should be looked for on calcareous soils. The leaves are easily spotted because of their very deep dissection to at least 7/8 of their lengths, with very narrow and divergent segments even early in their growth. The petiole hairs seem always to be appressed (on the basis of the two colonies examined, and descriptions in CTW, Stace, and the Plant Crib), and a very characteristic shape - medium long, swollen and abruptly tapering to the tip. No other hair types are present.

Geranium columbinum

Leaf shape

X1

Petiole hair type 5



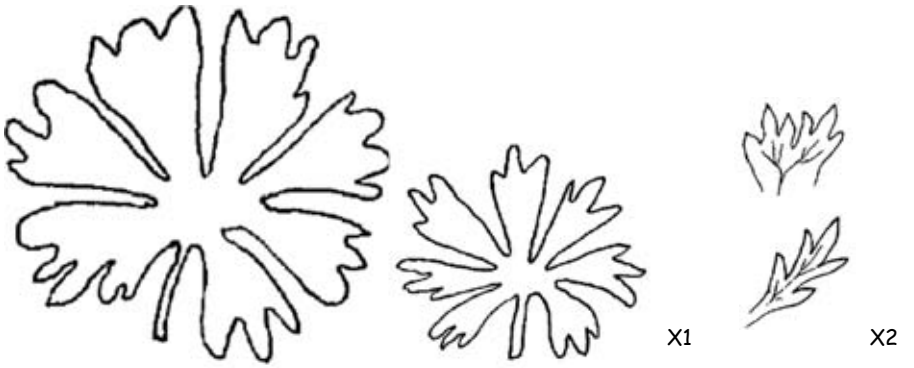
X10

X20

3. **Geranium dissectum** is usually spotted by its deeply dissected leaves with fairly narrow and divergent segments, more dark green and leathery looking than *G. pusillum*, which has segments usually also wider and more contiguous. However, early in growth the leaf segments of *G. dissectum* can be wider and more contiguous, approaching *G. pusillum* or *G. molle* in appearance. Leaf dissection is usually to 3/4 - 7/8, sometimes to only 1/2 to 2/3 or so early on. The main petiole hairs are medium long, variable in length and irregularly deflexed giving an untidy 'shaggy' look. Very short glandular hairs are also usually present.

Geranium dissectum

Leaf shape

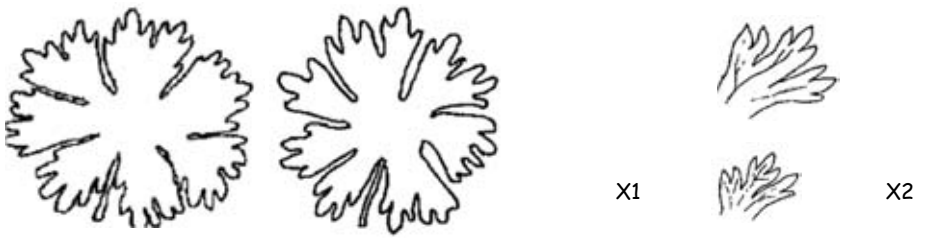


Petiole hair type
(1) 4

4. **Geranium pusillum** leaves are often indicated by their fresh pale-green colour, delicate texture and 'frilly' edge. The leaves are usually dissected to around 2/3, with lobes fairly contiguous to their ends, and are themselves finely dissected, often with characteristic long 'pointed club' lobules, giving the 'frilly' look. The main petiole hairs are usually very characteristic - 'brush like', very short, closely spaced, eglandular hairs which are of uniform length and very evenly deflexed to patent. On occasions, however, the short eglandular hairs are interspersed with an occasional patent medium length eglandular hair, or the short eglandular hairs are all slightly irregular in length. This latter variant can suggest the shaggy medium length hairs of *G. dissectum* on a narrow petiole, but if wider petioles are examined the extreme shortness of the hairs should be apparent. Very short glandular hairs are nearly always present but very difficult to see. I have never seen the rare glabrous petioles mentioned in the Plant Crib.

Geranium pusillum

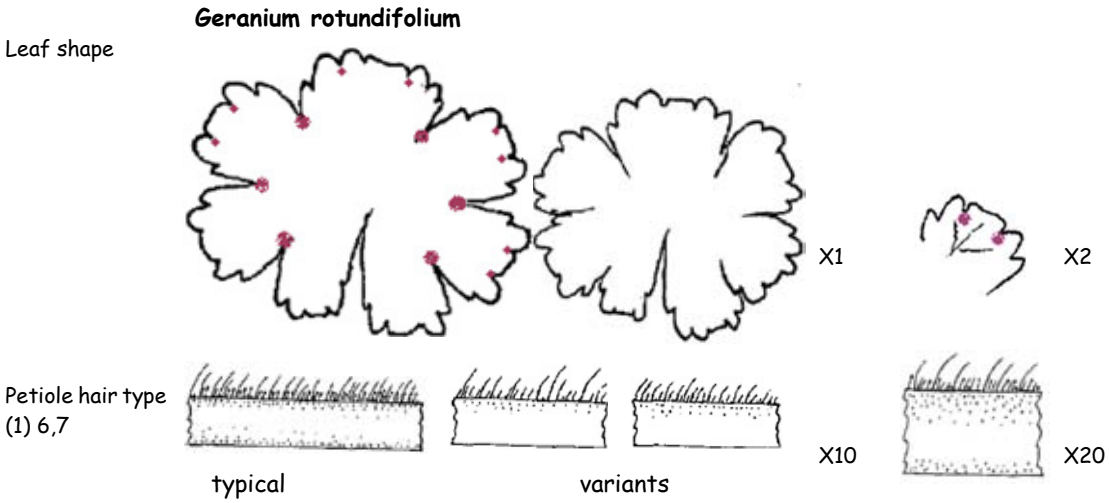
Leaf shape



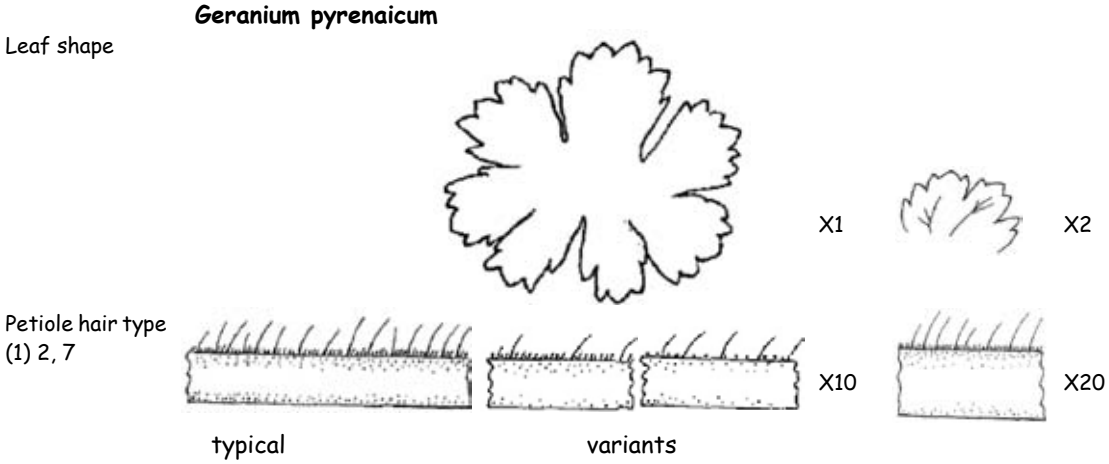
Petiole hair type
(1) 2

typical variants

5. **Geranium rotundifolium** leaves usually catch the eye because of their large size, much like *G. pyrenaicum*, but with a paler grey-green colour, and often held aloft on more or less vertical petioles which have a characteristic 'powdery pink' appearance (due to the red stems being seen through a 'frost' of dense medium long glandular hairs). Another potential diagnostic feature is the presence of dark red dots at the sinus between each leaf segment, which is seldom, if ever, found in the other species. Leaf dissection is usually to around or just less than 1/2, but with some dissections only to around 1/3, and with the lobes only shallowly dissected, giving a more entire, reniform look. As described in the Plant Crib and originally by Philip Oswald the central lobule of each lobe tends to be square - this is only occasionally seen in *G. pyrenaicum* or the other species. The petiole hairs are in my experience more clearly defined and invariable than suggested in the Plant Crib. Glandular hairs seem nearly always to be present on spring leaves, and are usually of fairly uniform medium length, c. 1/2 – 2/3 the length of the long bristly eglandular hairs and mixed with eglandular hairs of the same length. The glandular hairs may be very sparse at the base of the petiole, but can become extraordinarily profuse just beneath the leaf attachment. Sometimes, however, they may be absent and replaced by similar length eglandular hairs, especially in overwintering rosette leaves produced in late summer or autumn.

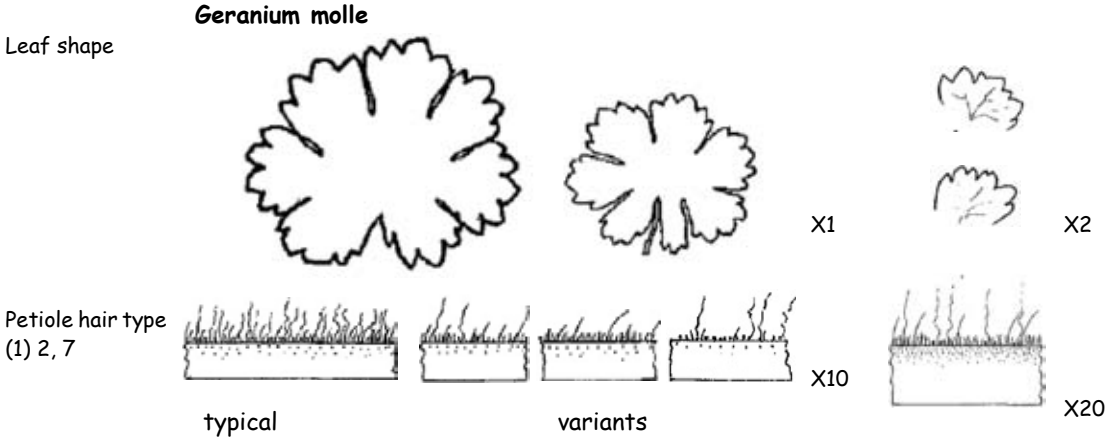


6. **Geranium pyrenaicum** may often be picked out by its large rather leathery leaves, mat dark-green in colour, which characteristically in spring are few in number and sprawling, rather than forming a proper rosette. Leaf dissection is usually to just above or below 1/3 sometimes to 2/3, rather like *G. molle*, but the leaves are usually larger and thicker in texture. The petiole hairs are quite distinctive with a mixture of three hair types - very short glandular, short regularly deflexed or patent 'brush-like' hairs of uniform length, and more occasional long bristly hairs. The long bristly hairs can be very sparse and can be missed if a sufficient length of stem is not examined - the other two hair types seem more or less identical to those in *G. pusillum.*



7. **Geranium molle** growing on poor soils can have very small basal leaves, with bright wine-red petioles forming tiny flattened rosettes. On better soils, and in more moist conditions, the leaves can be as large as *G. pusillum* and *G. dissectum* but they are usually darker green than the former and less dissected than either, to just above or below halfway. The petiole hairs are usually very characteristic, with 4 types of hairs - very short glandular, short to medium-short irregularly deflexed to patent eglandular, long bristly eglandular, and very long 'wispy', silky hairs that are diagnostic when present.

   Occasionally these very long wispy hairs are absent and the leaves might then be mistaken for *G. pyrenaicum* - the sparse long bristly hairs of this species are similar to those in *G. molle*, but mixed with a neat 'brush like' layer of uniformly deflexed or patent hairs unlike the untidy mixture of short and medium short eglandular hairs in *G. molle*. Occasionally, however, it might not be possible to distinguish this variant without wispy hairs from *G. pyrenaicum*. It might also be inseparable at times from the variant of *G. rotundifalium* with medium and long eglandular hairs.



Author's Note, 2015: Since this article was first published in 2005, further experience with this group has confirmed most of the above to be reliable field characters, although we have found that the diagnostic medium length glandular hairs of *G. rotundifolium* appear to be absent on overwintering leaves produced in late summer and autumn, being replaced by eglandular hairs of the same length. Some plants will then resemble the variant of *G. molle* without the diagnostic very long, wispy, thin hairs; or *G. pyrenaicum*. However, we have also found that leaves of *G. rotundifolium* nearly always have dark red spots at the sinus between each leaf segment, which rarely (if ever), occur in *G. molle* or the other species (do not confuse these with the large dark purple blotches of *G. x oxonianum*). This together with the other leaf characters described above may allow a determination when looking at atypical variants of *G. rotundifolium, G. pyrenaicum* and *G. molle,* although in around one in twenty cases, even with experience, some plants will be unidentifiable.

Conclusion

The main message contained within the original article remains the same: that leaf characters and 'jizz', although useful as 'spotting' characters, should not be used on their own. Around 1/3 of specimens identified only by leaf character and jizz will be found to be another species on close examination of the petiole hairs. The majority of specimens can be identified using the petiole hairs, as long as one is clear about what types of hair one is looking for, by using the hair type diagram and the sets of drawings above.

Bob Leaney

FREE TO A GOOD HOME…

I seem to have ended up with some duplicates of Watsonia and BSBI News. If anyone is missing any from their own collection/wants to add to a recently started run, then let me know. I will be passing them on to their new home on a first come, first served basis.

Jo Parmenter 07710 252468

WATSONIA

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……. AND IN 2016?

Highlights for 2016 include…..

Ditches, ditches and more ditches – as well as the annual excursion to Halvergate, I have also agreed access to Heigham Holmes (NT) and Haddiscoe Island. Don't get too over-excited: these ditches are all slightly brackish and on clay, so won't be all that species rich. These areas are, however, under-recorded, at least as far as the Flora is concerned, so we would very much appreciate a good turn-out.

Bashing the Borderlands - a joint E-W initiative to look at under-recorded tetrads on the vice-county boundary. The excitement will be compounded by rigorous monitoring of the latitude, so that we don't inadvertently cross over to the dark side.

Mid Norfolk Railway – please note that Mary and I will not be amused if people flock to attend this having carefully avoided the dull ditches and tetrad bashing events…….

Wet Meadows, courtesy of Norfolk Wildlife Trust.

Arablescapes – a couple more farms.

Broadland Fens - we will once again brave death (Lyme disease, snake bite, drowning, heat stroke etc. etc.) … and worse….. at Barton Fen, Hoveton Marshes and The Trinities.

Norfolk Archaeological Trust sites – a dash of heritage with your botany, to ensure that we remain intellectually-rounded individuals. On the other hand, it may already be too late.

Workshops – the usual one on brambles, plus *Medicago* & *Trifolium,* and *Salix* spp.

Wild Flowers Revealed - an event is planned in both E and W in 2016, provided that BobL doesn't come up with another excuse for not leading them……

More cake

And beer - we are going to carry out a pub review after each visit, scoring each establishment on the important things like range and quality of beer, condition of ladies toilets, attitude of staff to damp or muddy clientele, etc; with a view to finding NFG Pub of the Year 2016.

And interesting plants (hopefully).

Jo