



Mentha pulegium var. erecta Meg Miller

Editorial

Firstly, I would like to thank Jo Parmenter for instigating the Norfolk Flora Group (NFG) Newsletter in 2015 and doing such an amazing job as editor for the first nine issues. I now have the enviable task of taking over as editor. I hope you will appreciate the new look and continue to enjoy hearing about the NFG activities.

We had a busy 2024 season with 41 meetings. This included hosting a 2-day BSBI meeting in June at Beeston Bog and Holkham Estate, the full report can be found in the BSBI Yearbook with some wonderful photographic highlights from Mike Ball included in this newsletter. There were 17 meetings in the West of the county (v.c 28) and 16 meetings in the East (v.c 27) including seven ‘missing monad’ meetings. Two ‘Wildflowers Revealed’ meetings were held in collaboration with the [Norfolk & Norwich Naturalists’ Society](#). One of the purposes of these meetings is to attract some new interest in botanical recording. Thanks to Alex Prendergast for leading four workshops: our two standard workshops on *Taraxacum* and *Rubus* with the addition of *Ulmus*; then two further workshops on *Euphrasia* and *Salicornia*. These are valuable additions to our field meetings and a welcome opportunity to both revise and continually learn about these difficult groups. Finally NFG made an enthusiastic contribution to the [BSBI New Year Plant Hunt](#). We found 81 species in flower in Great Yarmouth and 77 species in flower in Sheringham. Overall we had four lists in the top twenty longest lists for the whole country.

The field meeting programme and past newsletters are made available on the NFG website <https://www.norfolkflora.org.uk/>. Resources from previous workshops are also available on the NFG website including Bob Leaney’s amazing illustrated keys.

We are working towards publishing an updated Flora of Norfolk, Bob describes our progress in detail in his article which is followed by a summary of the ‘missing monad’ meetings held in 2024. Please have a look at our progress and the issues involved in obtaining even coverage of the whole county and let us know if there are areas in which you would like to contribute.

Janet Higgins

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Acknowledgments

Our particular thanks go to the various landowners who allowed us access in 2024.

Thank you to all the NFG contributors to this edition: Mike Crewe, Bob Ellis, Mike Ball, our celebrity guest contributor BSBI Country Officer, James Harding-Morris, our perennial puzzle-setter, the Sedge Warbler and Jo Parmenter. Thank you to Bob for his help in the production of this newsletter.

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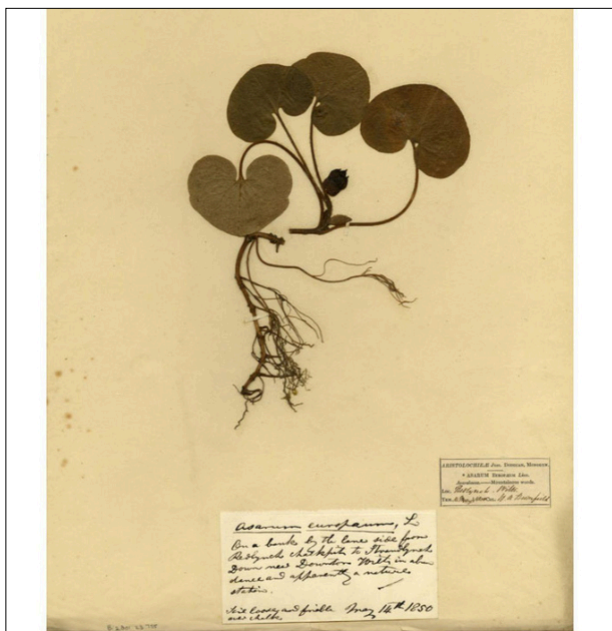
The views and opinions expressed in this Newsletter are those of the individual authors, not of the Norfolk Flora Group, nor its membership in general.

Firstly, my thanks go to Janet for asking me to write something for the Norfolk Flora Group newsletter, and for giving me free rein to write about a particular interest of mine.

Back in April 2018, on a drizzly spring day, I found myself on a quiet, shady lane near Redlynch in South Wiltshire. As is often the case, this was a brief stop-off whilst on a drive somewhere - I take several botanical diversions when driving anywhere - and my memory is now blank as to where I was actually driving from or to. But I always remember the plants!

In this case the plant was *Asarum europaeum* Asarabacca, the first time I had ever seen it. If you've not had the pleasure of seeing this species for yourself then allow me to describe it; small, glossy, kidney-shaped leaves absolutely carpeted the bank of the lane. Kneeling and parting the glossy leaves revealed organ-red, bell-shaped flowers with three curving tips, evoking the eerie allure of carnivorous plants. These flowers are said to be carrion-scented but despite a few adventurous sniffs, I couldn't detect it.

Obviously, seeing such an odd plant for the first time is a joy, but this was enhanced, for me, by knowing that this population was around two centuries old; first recorded here in the 1820's. There's a grand picture of a herbarium specimen from this site [here](#) from 1850.



This was the first time that I was struck by how - in my opinion - a neophyte can develop a particular, local heritage that is worth appreciating and valuing. I started hunting around for other examples of species like this; those aliens with a long history in a particular site and with no indication of a desire to spread across

the landscape. I tried to come up with a name for them, 'heritage aliens' or 'pedigree neophytes', though perhaps simply 'heritage plants' is better.

Other examples I discovered were *Chaenorhinum organifolium* Malling Toadflax in West Malling, Kent, where it's been known since 1880, and from which it gets its vernacular name. In Geoffrey Kitchener's marvellous Rare Plant Register he includes it as a 'Kent heritage plant' on the basis that its:

'probable first introduction to the British Isles was at West Malling; this location has supplied the only long-standing permanent population in the country; and its usual English name of Malling Toadflax reflects this close connection with Kent. It is probably rare nationally (given that some of its recent records will have been casual) and it is rare in Kent.'

Other members of the 'century club' (those heritage aliens who have stayed in the same spot for a 100 years or more) include *Omphalodes verna* Blue-eyed Mary, an account of which I spotted in Arthur Chater's magnificent Flora of Cardiganshire. This neophyte has a long pedigree, being known since 1892 in Cwm Woods. There's also *Aquilegia pyrenaica* Pyrenean Columbine, which was planted at Caenlochan in Scotland and discovered there in 1895; it was still present in 2005. There's also *Tanacetum macrophyllum* Rayed Tansy, which has been known near the ruins of Jervaulx Abbey in North Yorkshire since apparently at least 1912 (though this early date isn't on the DDb). These plants, though introduced, have woven themselves into the cultural and ecological fabric of their locales, becoming a subtle yet significant part of the landscape's identity.

Sticking with Yorkshire abbeys - though without a full century of records behind it just yet - is *Dianthus plumarius* Pink, known from the ruins of Fountains Abbey in North Yorkshire. These crumbling walls are garlanded with vegetation like the Hanging Gardens of Babylon, with records of *D. plumarius* here back to 1938 (according to the DDb).

Pinks and ruins have a long history. The first wild record of *Dianthus caryophyllus* Clove Pink in Britain was in 1666 on the walls of Rochester Castle. It survived here for over three hundred years, before disappearing at some point in the 1990s. This brings me to my key point. On paper, this is simply a story of a neophyte that arrived in Britain, survived for a time, and disappeared. While *D. caryophyllus* may lack direct conservation value, its disappearance feels like the loss of a thread in the tapestry of Britain's cultural and botanical heritage. I think over those three centuries the

Dianthus gained a cultural value; as intimately intertwined with the castle and its history as any other artefact.

My request to readers is therefore twofold. Firstly, consider whether your vice-county may be home to heritage plant species - something that's not captured by your Rare Plant Register. Secondly, let me know if you can think of any other species that you think meet my vague criteria of a heritage plant (a neophyte, not really spreading, staying in the same place for a long time). I have no idea what I will actually do with this information, but perhaps something, someday. Perhaps by identifying and valuing these heritage plants, we can preserve the stories and connections that enrich our landscapes. I invite readers to help uncover these hidden gems and celebrate their enduring legacy

Norfolk already has one contender I am aware of, *Lathyrus heterophyllus* Norfolk Everlasting-pea, known - since 1949 I believe - in the dunes at Burnham Overy Staithe. On one hand it is faintly bizarre that this alien has received a vernacular name so proudly stating its non-native range. On the other hand, isn't it fascinating that Norfolk is home to the only persistent site for this species across all of Britain and Ireland?

[James Harding-Morris](#), BSBI Countries Manager



Lathyrus heterophyllus Norfolk Everlasting-pea
Rob Still / Chris Gibson <https://plantatlas2020.org>

Grass-poly *Lythrum hyssopifolia*: a fourth record for East Norfolk

Janet Higgins

We were very pleased to have the opportunity to visit the Earsham Estate on 29th June and 10th August to record both the quarry and surrounding woodland with the kind permission of Nick Meade, the landowner. Between the meetings, on the 10th July, Nick sent a photo of a small plant with tiny pink flowers which he had found in a disused part of a quarry to Jo Parmenter. Jo identified it as *Lythrum hyssopifolia* Grass-poly. Recognising it as a significant find, Jo immediately informed Meg Miller, Dorothy Casey and Bob Ellis. Meg spent a wonderful day on the estate and was able to find 45 flowering plants, which she recorded meticulously, with detailed grid references. She also noted that some were quite small, and that as others grew there may be a possibility of finding more. The plants were growing on the edge of a zone of *Crassula helmsii* New Zealand Pigmyweed, a Schedule 9 plant, about which Nick was in touch with Alex Prendergast from Natural England for advice on eradication, and before Nick was able to alert them, the team carrying out the eradication work had applied herbicide.

Fortunately, on 5th August, the eagle-eyed Meg found a further patch of over 200 Grass-poly plants quite separate from the *Crassula* zone. This was an ideal area for the NFG to twitch the plant on our second visit on 10th August.



Grass-poly *Lythrum hyssopifolia* Meg Miller

Excitedly, cameras to the ready, we followed Meg to the second population she had found, where we had to tread carefully to avoid standing on the many small plants of grass-poly (10-15cm high) which were growing amongst taller vegetation on the edge of a draw-down zone. The more we looked, the more we found and we all homed in on the ones with the best open flowers to get a good photo since this was such a rare opportunity to see such an abundance of grass-poly in such prime condition.



The tiny pink flowers of Grass-poly *Lythrum hyssopifolia* compared to the larger 'daisy' type flower of Scentless Mayweed *Tripleurospermum inodorum*
Meg Miller

To give a bit of background on the significance of this discovery: this is only the second record of *L. hyssopifolia* in v.c. 27 this century, the first two finds being in 1906 at Brumstead (Rev. M.C.H. Bird) and around the same time in Heigham (Miss A.M. Barnard) (Nicholson 1914). The first recent find of *L. hyssopifolia* was in 2020 (Sayer and Parmenter 2021) and its reappearance at the site was attributed to buried seeds being exposed after the disturbance of the ground when the Norfolk Ponds Project (NPP) were restoring a pond in the village of Heydon.

L. hyssopifolia is a rare plant in the U.K, it is classified as Endangered on the Red List for England. It is a species of bare mud and disturbed wet ground that is flooded in winter, but which dries out during spring and early summer. It produces many tiny seeds and these can remain viable for many years until they are brought back to the surface by disturbance and are able to establish in the absence of too much competition. It is unknown whether the seeds were in the seed bank or

were brought in on machinery. Perhaps other quarries in Norfolk, which are a favourite hunting ground for the NFG, may turn up further discoveries in the future.

Alongside the excitement of grass-poly, I also have to mention the minty scent which filled the air as we got out of our cars. There was a sea of *Mentha pulegium* Pennyroyal with whorls of lilac-mauve flowers. These plants are of uncertain origin but the conclusion was that they were var. *erecta*, a robust upright introduction rather than the prostrate, weakly rooting native var. *decumbens* (Stroh 2014).



Pennyroyal *Mentha pulegium* Meg Miller

Thank you to Meg Miller and Jo Parmenter for their help in writing this article.

References

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- Sayer, C. and Parmenter, J. 2021 BSBI News 146:11-14
- Stroh, P.A. 2014. *Mentha pulegium* L.. Pennyroyal. Species Account. Botanical Society of Britain and Ireland. https://bsbi.org/wp-content/uploads/dlm/uploads/Mentha_pulegium_species_account.pdf

Photographic Highlights from the BSBI Summer Meeting *Mike Ball*

Beeston Common & Beeston Bump
23/06/2024



A glorious June day attracted about thirty people to sample the botanical delights of Beeston Common and Beeston Bump.



Sundews never cease to amaze. The glistening drops of sticky enticement perched atop the delicate red tendrils, primed to curl inwards once an insect is trapped.

Round-leaved Sundew (*Drosera rotundifolia*) nestled in a bed of Lustrous Bog-moss (*Sphagnum subnitens*) complete with capsules.



My first year at beginning to put some names to sedges and rushes. This one was particularly striking with the delicate dark streaks either side of the mid rib of the tepals and the very long anthers. This was the only picture where both features came out clearly. The BSBI distribution map shows it is more common in western Britain so it was a lucky day to find it in the east and in such good flowering condition.

Leafy Rush (*Juncus foliosus*)



When I looked this one up I came across an article from the NFG Winter newsletter of 20/21. A rush that had been observed at Beeston Common since 2006 was finally queried by Marilyn Abdullah in 2020, determined by Mike Padfield in September that year and later confirmed by Fred Rumsey. A gem, hiding in plain sight.

Pendunculate Club-rush (*Bulboschoenus laticarpus*)



Standing tall and proud. I do like a Marsh Arrowgrass (*Triglochin palustris*)

I did wonder about Triglochin

Tri as in three and -glochis meaning pointed, which you may know alludes to the pointy ends of the fruiting ovary. If not, this bit of etymology is for you and me.



A rare plant with a distinctive leaf more usually found in Broadland.
Crested Buckler Fern (*Dryopteris cristata*)

An early photograph from 1839 by Fox Talbot and found in the [‘Brewster’ Album](#) in the Getty Museum was of a Buckler Fern. In those early days of photography he would have needed a day of good sunlight to achieve his image. Today we carry it on top of the camera.

Fox Talbot also laid the foundations for the work of one Anna Atkins. Anna was a knowledgeable amateur botanist and superb botanical illustrator, who then went on to use cyanotype to produce images of ferns, plants & algae, amongst other things.

[Anna Atkins, Mistress of Blueprint Manor](#)





So the question for me is - Can you see the cluster of fleas?

Flea Sedge (*Carex pulicaris*)

Again it's one of those things you may know but as I said earlier it's all very new to me.
It was a brilliant day with lots to see, learn, enjoy & think about.

A Very Grand Day Out

And one more thing

A constant onstage term for Steve Jobs at the end of an Apple Event, back in the day.
From the Wildflowers Revealed meeting of the Norfolk Flora Group this year at Ickburgh.
I didn't see it on the day and went back a few days later to find it.

Such a stunning little plant.



Bird's - foot (*Ornithopus perpusillus*)

With the usual apologies for those who know.
A dinosaur of a plant in the sense that an ornithopod is a dinosaur whose hind legs are like those of a bird and in this case the plant lying close to the ground (perpusillus or prostrate).
AKA - A squished, bird's foot dinosaur plant

When out recording, we've all had times when we've felt the need to re-visit a plant. It may be that the key identification characters are not present at the time of our original discovery of the plant; or perhaps we need to get a referee or county recorder to take a look at something and confirm an identification.

To achieve a re-visit, we need to record the location of a plant such that we, or someone else, can find it again - preferably without much trouble. These days, most of us have the means to be able to record the Ordnance Survey grid reference for a location without poring over a paper map; we can either use a GPS unit such as those produced by Garmin, or, perhaps even easier, we can download an app to a smart phone and get instant location details, usually to an acceptable degree of accuracy.

In the old days of paper maps, we all got used to recording to a six-figure degree of accuracy, but now that we have ready access to greater accuracy, we need to dare to step into the heady realms of eight-figure grid references. I have often returned to a location armed with a six-figure reference and found it impossible to relocate a plant, so I've gradually worked up a system which seems to work well in the majority of cases. Here, I'll first demonstrate the difference that six-figure versus eight-figure grid references makes to the area needing

to be searched, then show the method I have developed more recently for recording the location of an individual plant with a view to revisiting it in the future.

Six-figure versus eight-figure grid references

We all know that the more figures in a grid reference, the more accurately it defines a location. Each extra ordinal gives ten times greater accuracy, so it really does make a difference. A six-figure grid reference will indicate an area of ground of 100x100m. That equates to 10,000m². While we might think that six figures is quite useful (and it is, to a point), it really does leave us with a lot of ground to cover if we want to find a specific spot. By contrast, simply stepping up to an eight-figure reference will give us an area of just 10x10m – or 100m². That's quite a difference!

I've put this into context using some screenshots to demonstrate how this looks in two different search scenarios. The screenshots come from UK Grid Reference Finder (<https://gridreferencefinder.com/>), a website that gives you location data in a range of forms, including OS grid references to 10 digits, Easting and Northing co-ordinates, latitude/longitude (in both traditional and decimal formats, the latter used by many in-car GPS systems) and What3Words.

An urban search

In an urban location, we might find something self-seeded on the pavement edge or in the gutter along a street. The plant is small as it's only recently germinated in April, but it looks interesting so we need to return in the summer.

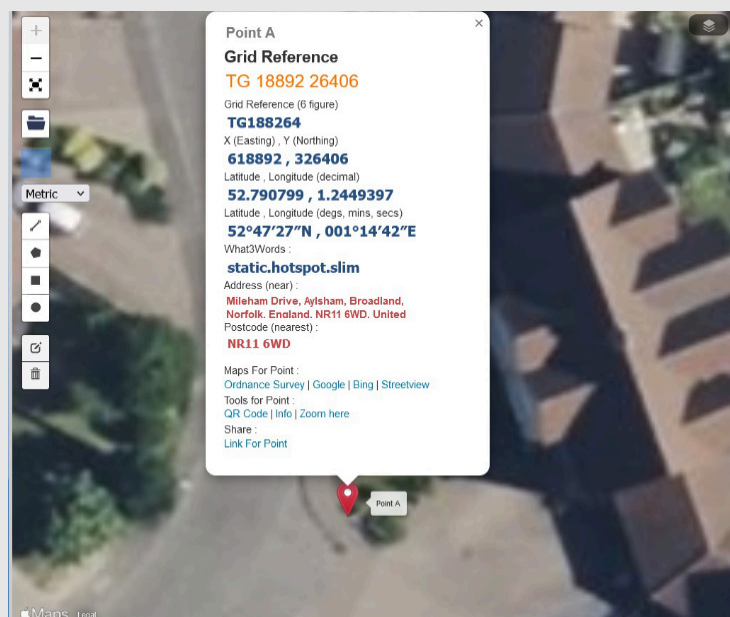


Fig 1. Point A shows the hypothetical location of a plant we want to re-visit in Mileham Drive, Aylsham. I've left the data window open to show the grid reference for this location. You can see that a six-figure grid reference is given as TG188264.

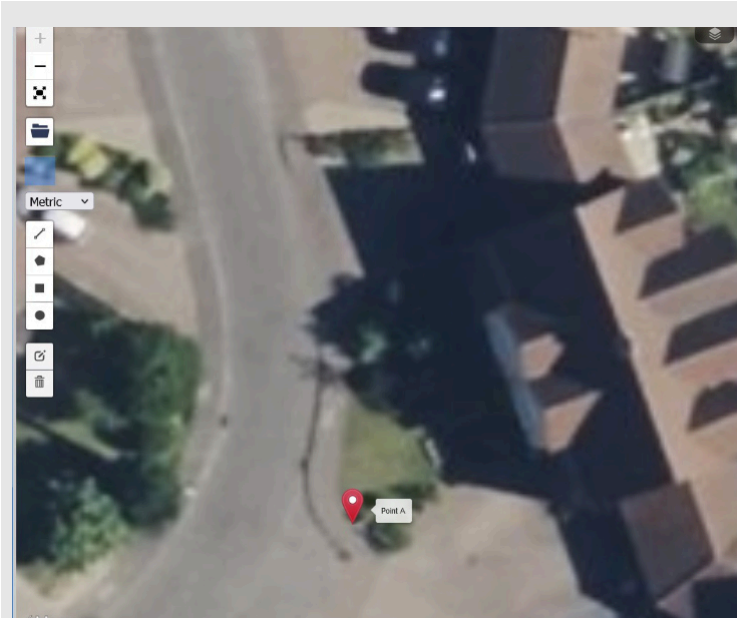


Fig. 2. This is the same screen view as Fig. 1, but I've closed the data window to show more of the aerial view. Imagine the plant is a small seedling on the edge of the pavement, next to a gravelled corner bed.



Fig 3. In this screenshot, I have left the marker for Point A in place (now in the bottom right corner of the picture). I have also now added the marker for the six-figure grid reference TG188264. The mapping system will place this point at the bottom left corner of the area covered by that six-figure reference. That is, at the bottom left of a 100x100m square. By advancing the reference by one digit north and east and dropping more markers, we can demonstrate the entire 100x100m square. Thus, by sending someone this six-figure reference, we are saying 'The plant is somewhere in that area'... that's a lot of pavement edge to search!



Fig. 4. Here's what happens when you step up to an eight-figure grid reference. Retaining the same screenshot to show the 100x100m square, I've now added in the 10x10m square that we get by using eight figures for our grid reference. Point A is still present in the bottom right corner and we can also see the tight cluster of markers around it.

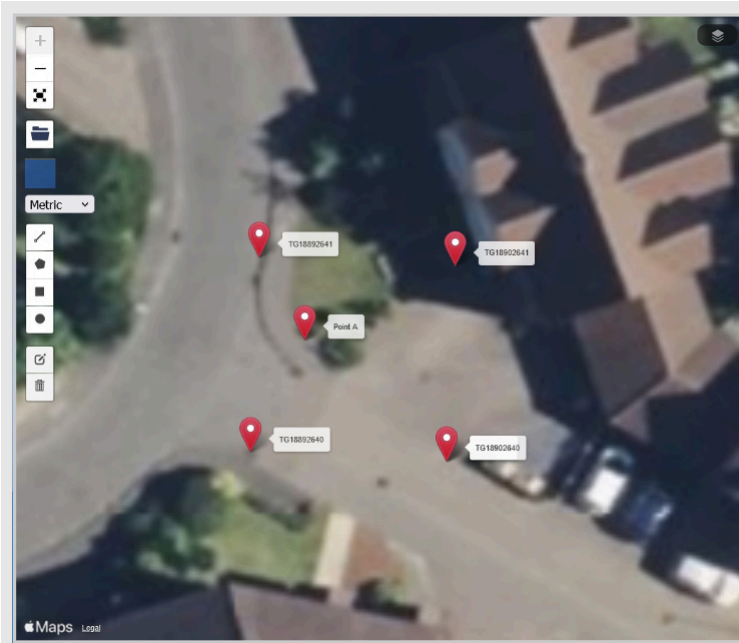


Fig. 5. Zooming in, we can now see the area enclosed by the eight-figure grid reference, plus the actual location at Point A. If we also add some location information ('on the border between the pavement and a gravel bed'), we now have a pretty small area to check before we (hopefully!) find the plant.

A rural search

In a more rural area, our plant may not be along a linear habitat such as a pavement edge, meaning a greater area to search for us to re-find the plant. Here's a set of screenshots using the same process as the urban maps, but showing a more homogeneous block of Breckland grassland where we might be checking later in the year on what we hope is a leaf rosette of Spanish Catchfly!

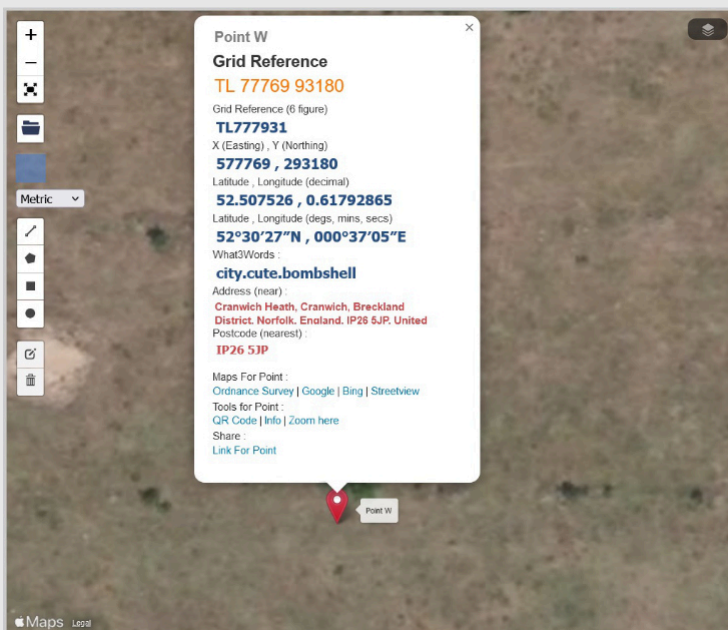


Fig 6. Our plant location, at Point W, here with the location data showing the six-figure grid reference of TL777931.

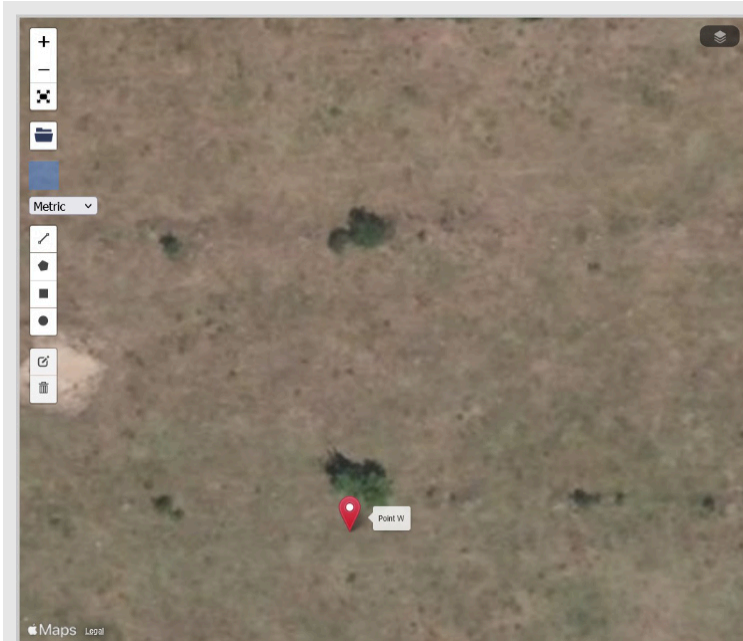


Fig.7. Our plant location with the location data hidden, nicely showing the uniformity of the habitat – but thankfully with one or two bushes as useful features!



Fig. 8. Plotting the six-figure co-ordinates to show the 100x100m square for TL777931. We can help a little by noting that the plant is ‘just south of a small oak tree’ in this instance, but it could so easily have been in that empty quarter towards the bottom left!



Fig. 9. Here the eight-figure grid reference is used to show the 10x10m square within the six-figure, 100x100m square. Again, quite a difference when it comes to a search area.

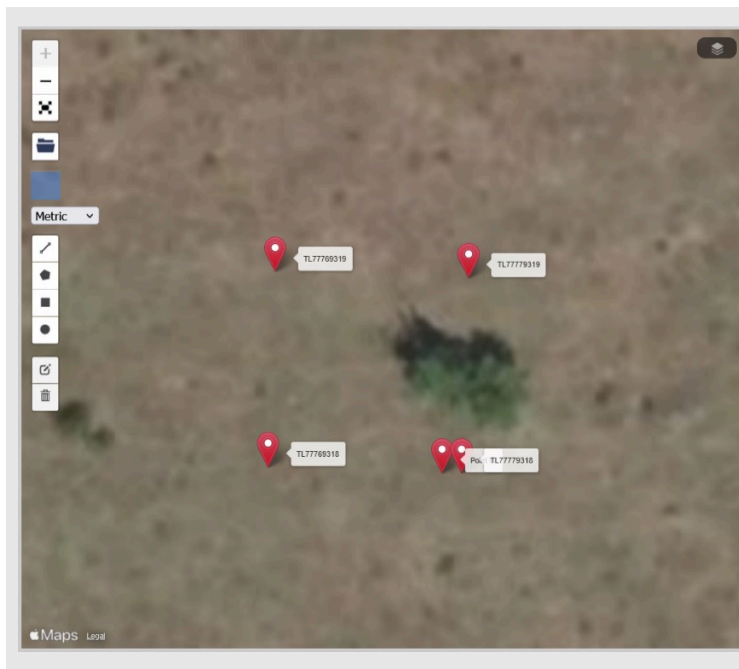


Fig. 10. And finally, the enlarged screenshot of the 10x10m square. I chose a fictitious plant location at random and, as it happens, my random location was right on the bottom right edge of the square; something else to bear in mind when searching – the plant isn't always going to be slap bang in the middle of the square covered by the grid reference.

Hopefully, these two examples demonstrate the far greater accuracy and far less search time that an eight-figure grid reference gives. It is of course tempting to suggest stepping up to a 10-figure grid reference, but there's a catch with that. GPS systems typically give a location accuracy to within around 4m (the accuracy is typically indicated on a Garmin and on some phone apps, too). Thus, a 10-figure grid reference would not give that much more accuracy than a 8-figure reference and the true location of your plant might even be well outside the grid reference square.

Being accurate in the field

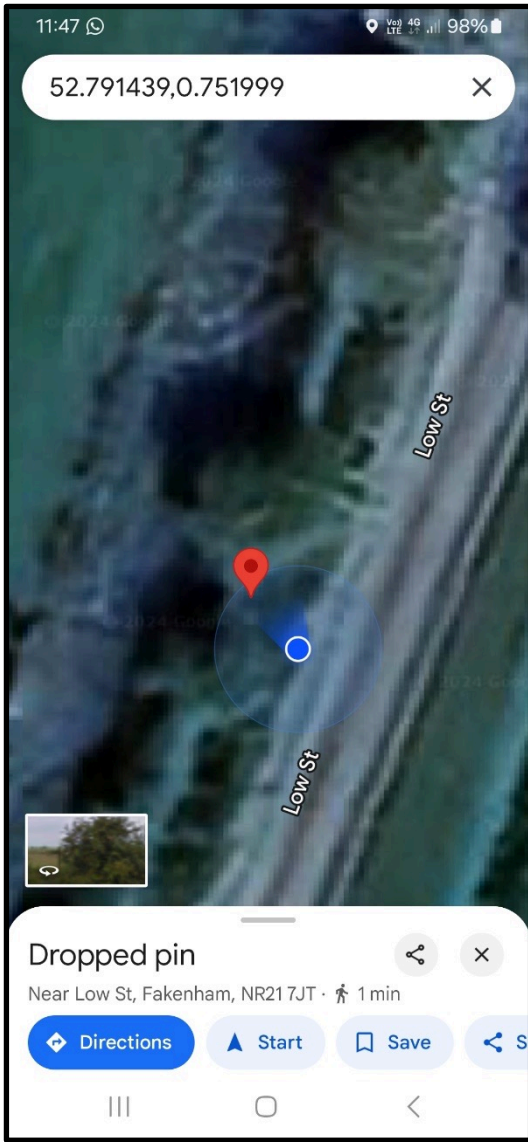
The above photos demonstrate the benefits of an eight-figure grid reference over a six-figure reference. So now we come to the initial reference plotting process. Whilst I often use a Garmin in the field, I've found that the benefits of an aerial photograph to ground-truth the location are enormous and, so long as I have phone reception (this is Norfolk, after all!), I have recently taken to using Google Maps to record locations. Smart phones all come with Google Maps already loaded and it should be easily locatable on your phone screen.

Opening the app with 'location' turned on will immediately give you a standard map with a blue dot on it. That blue dot is your location. By switching the base map to 'satellite' the background changes to an aerial photo and the photo definition is good enough that individual trees and larger bushes can easily be seen. It is now possible to look around and 'ground

truth' the location of your plant with the features around you that can be seen on the map. Incidentally, the size of the blue dot varies according to how good the phone reception is and how accurately your phone is picking up geolocation satellites; the bigger the dot, the poorer the location. But this is all good data as it gives a good visual cue to the accuracy at the time.

By zooming in, greater detail can be seen and you should now be able to touch a finger onto the screen pretty much exactly where the plant is. By doing this, the Google Maps programme will drop a pin and you will see a location reference appear in the bar at the top of the screen, which is typically given as a decimal GPS figure. If you now take a screenshot, you have a record of the plant location. I usually follow this with a photo of the plant, so that I know what the screenshot refers to and I often step back a little and take a view of the location to show any useful features such as bushes, trees, fence posts, sections of wall or whatever.

Once at home, these photos can be downloaded and stored for later reference. You can also convert the decimal GPS location to an OS grid reference simply by opening the Grid Reference Finder website (or a similar app on your phone if you have one) and entering the data there.



These two screenshots from my phone show the data that can be produced. On the left, the red pin is located between two obvious, larger bushes/trees and back in the hedgerow. This is actually for an as yet unidentified rose. A second shot (right) can be taken by zooming out to help identify the location, but dropping that decimal location back into Google Maps at a later date will get you there from anywhere in the world!



Hopefully this will all be useful and will help with what used to be a frustrating experience in the days of paper maps. It is, however, still very useful to add extra location notes, especially if someone else will be looking

for the plant. Notes along the lines of 'three paces east of the west end of the wall, next to a large stand of willowherbs' or 'on the path-side of a small Hornbeam with a broken branch on its left side'. It all helps!

A brief history

A Flora of Norfolk by Gillian Beckett, Alec Bull and Robin Stevenson was published in 1999, as I'm sure the majority of readers are aware. Records based on tetrads (2km by 2km Ordnance Survey grid squares) were gathered specifically for the purpose of the Flora between 1987 and 1998 but it was 'back-dated' to 1985 to include the data from the BSBI's monitoring scheme which were also gathered on a tetrad basis. Although these records were further boosted by data donated from additional surveys and organisations, it was an immense achievement that records were gathered from almost all the 1,428 tetrads that make up the two vice-counties within 12 years.

This was the first atlas Flora for the county of Norfolk, presenting tetrad dot distribution maps for most species. Earlier Floras (Trimmer 1866, Nicholson 1914 and Petch & Swann 1968) were essentially lists of species together with frequency, locations and with some brief notes. The latter two included mosses and liverworts and charophytes as well as vascular plants. Beckett *et al.* also included mosses and liverworts, courtesy of Robin Stevenson, but not charophytes.

Tetrad recording for dot maps was a fairly recent trend at the time. According to David Pearman (2024), the first tetrad-based Flora was J.G. Dony's Flora of Hertfordshire, published in 1967. Beckett *et al.* probably broke new ground by printing maps in colour and using a variety of backgrounds to the tetrad dots.

The first repeat tetrad Flora was Chris Boon's Flora of Bedfordshire published in 2011 which succeeded J.G. Dony's 1976 Bedfordshire Plant Atlas. This opened up the opportunity of comparing the two and showing evidence of any changes in the distribution of the county's plant species during the intervening years. Good evidence of this nature is dependent on even and equivalent tetrad recording coverage. This brings us to the main purpose of this article.

Figure 1 illustrates the number of vascular plant taxa recorded in each tetrad within the county between 1985 and 1998. It is important to note that the area recorded during this period was based on political boundaries. These are not the same as the Watsonian vice-county boundaries, which are used in the figures, and tetrads outside the vice-counties are excluded. Most of the tetrads at the fringes of the vice-counties are partial tetrads and colour of the tetrad square only represents data from the included part.

Figure 2 shows the same for the period 2000 to 2024. The present plan is to record only within the vice-county boundaries (shown on the maps as a purple line).

The species density patterns, particularly in figure 1, do reflect the expected species diversity. There's likely to be a fairly constant background of ubiquitous and near-ubiquitous species but this will be enhanced by the variety of habitats in each tetrad. The more diverse tetrads are likely to be further boosted if scarcer habitats are present, e.g. calcareous grassland, rich fen, deciduous woodland, heath and aquatic habitats etc. Urban areas are enriched by niches in walls, paving cracks, disturbed areas etc. and are fed by garden weeds and escapes.

The Norfolk part of the Fens shows up as a pale area, as do some of the Broadland grazing marshes. The 'chalk ridge' shows up as a dark area as does much of Breckland, the coast, the 'woodland arc' and the main urban areas. The pale area to the east of the shallow escarpment in West Norfolk, Gillian used to refer to as the Docking-Diss divide.

Although habitat diversity is probably the most important contributor to an apparently species-rich tetrad, other factors affect the picture. They could probably be summed up as 'recording intensity'. Perhaps the most important issue is access. Some tetrads, particularly urban ones, may have plenty of public access, others may just have one or two roads, tracks or footpaths, a few have no public access at all. Access to private land must be arranged and may or may not be forthcoming and that private land may hold habitats not present anywhere else in the tetrad. The available access in one tetrad might be explored to a lesser or greater extent than another and a tetrad might be visited on any number of occasions and at different times of year. Recorders' individual skills vary. Two or more members in a recording team may see more things than one alone and so on. To achieve perfect coverage is probably impossible and the best we can do is to hone our skills and try to maximise our 'recording intensity' while at the same time planning for even coverage across the whole county.

Comparing figures 1 and 2 reveals a number of disparities. East Norfolk appears darker overall in figure 2 and the opposite seems to be the case in West Norfolk. In East Norfolk the general pattern seems to be essentially the same in both figures although in the West it seems harder to discern in figure 2.

To make the comparison easier, figure 3 tries to show the difference between the two periods by simply subtracting the number of taxa in the first period from the second for each tetrad, then expressing this as a percentage of the total. This gives a range between -100% and +100%. Any change in the numbers could be explained by a genuine change in species density but may also be down to unequal recording intensity.

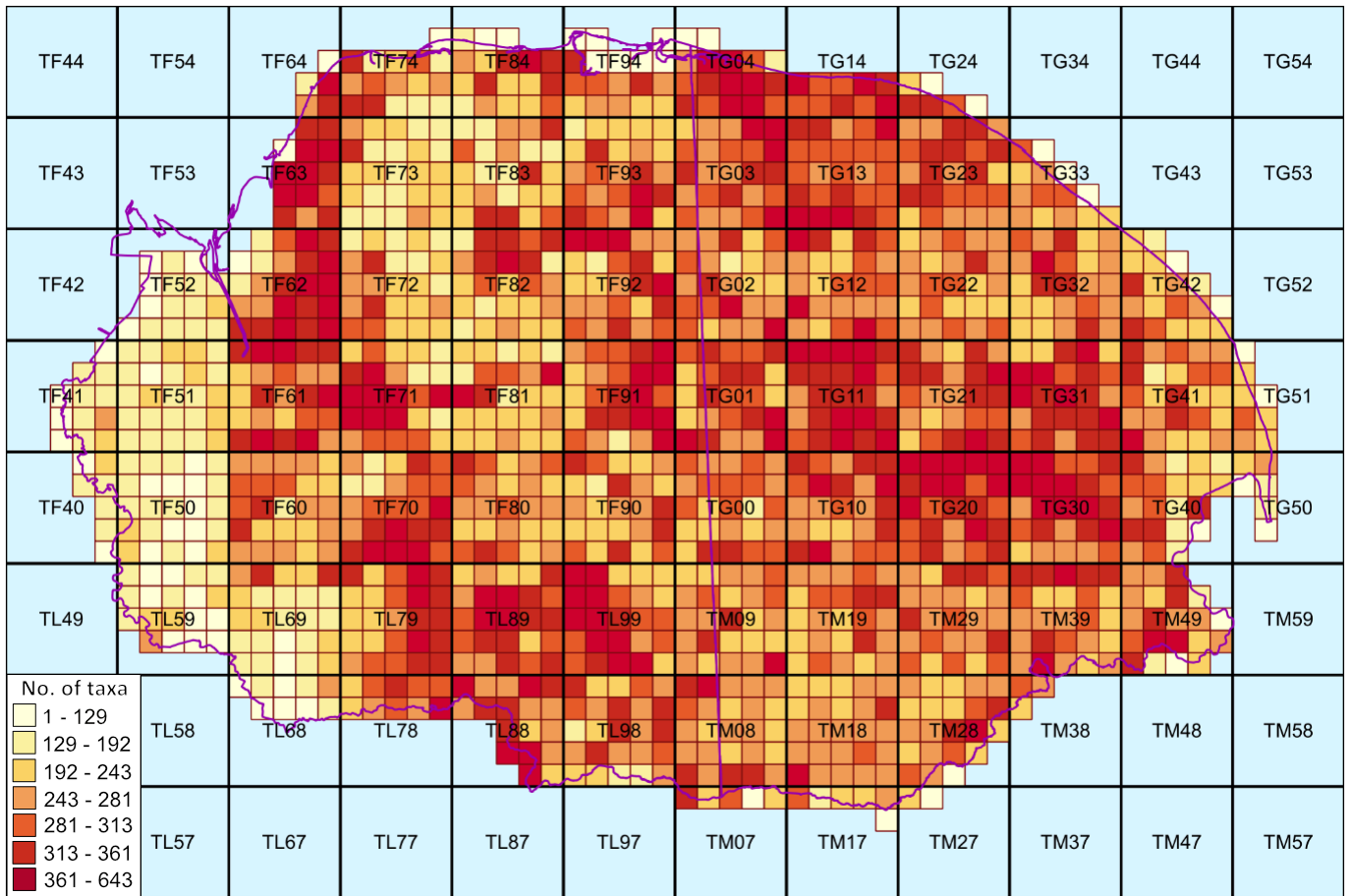


Fig. 1 The number of taxa recorded in each tetrad between 1985 and 1998 [note only tetrads within the vice-county boundaries are plotted]

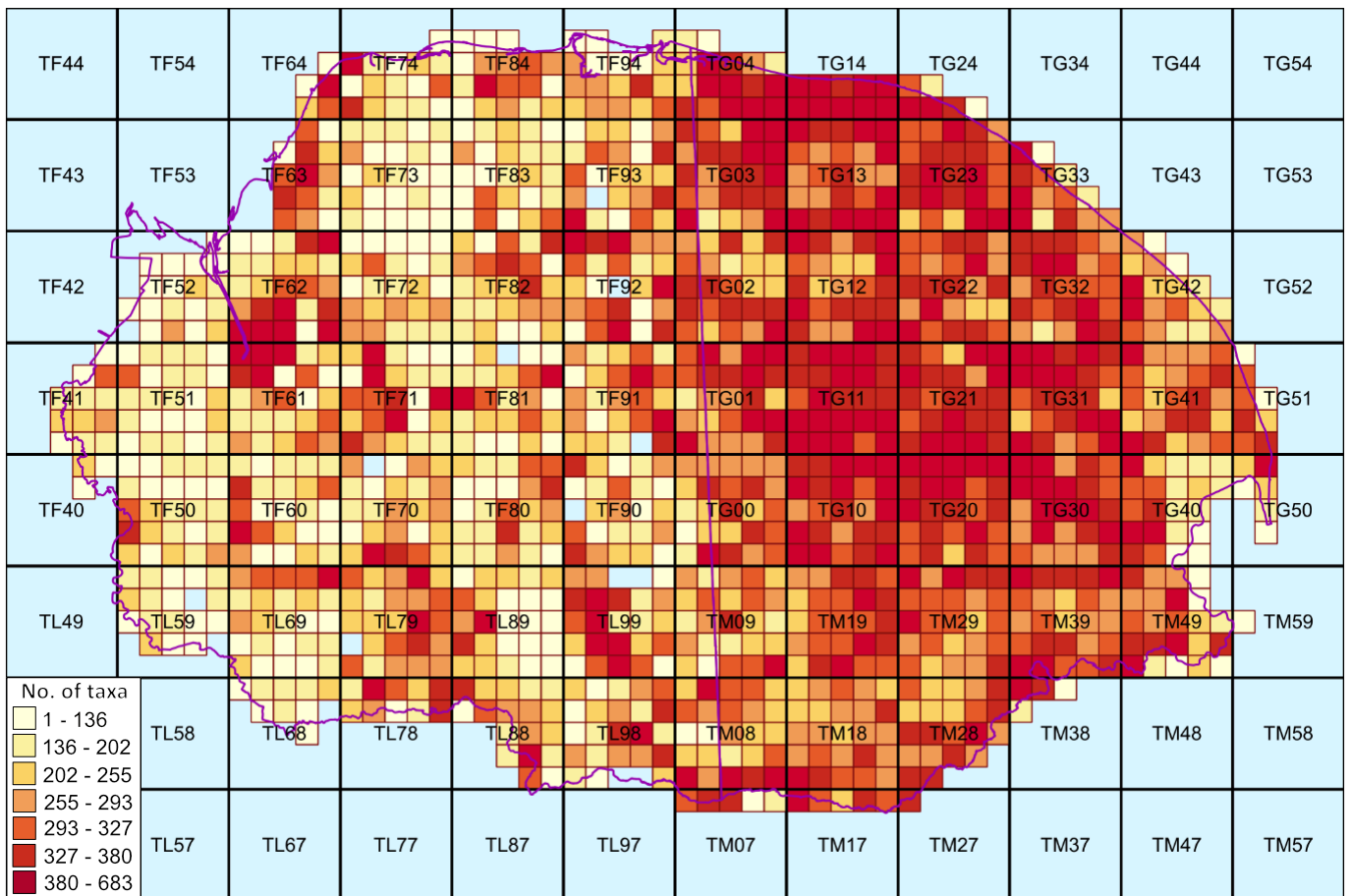


Fig. 2 The number of taxa recorded in each tetrad between 2000 and 2024

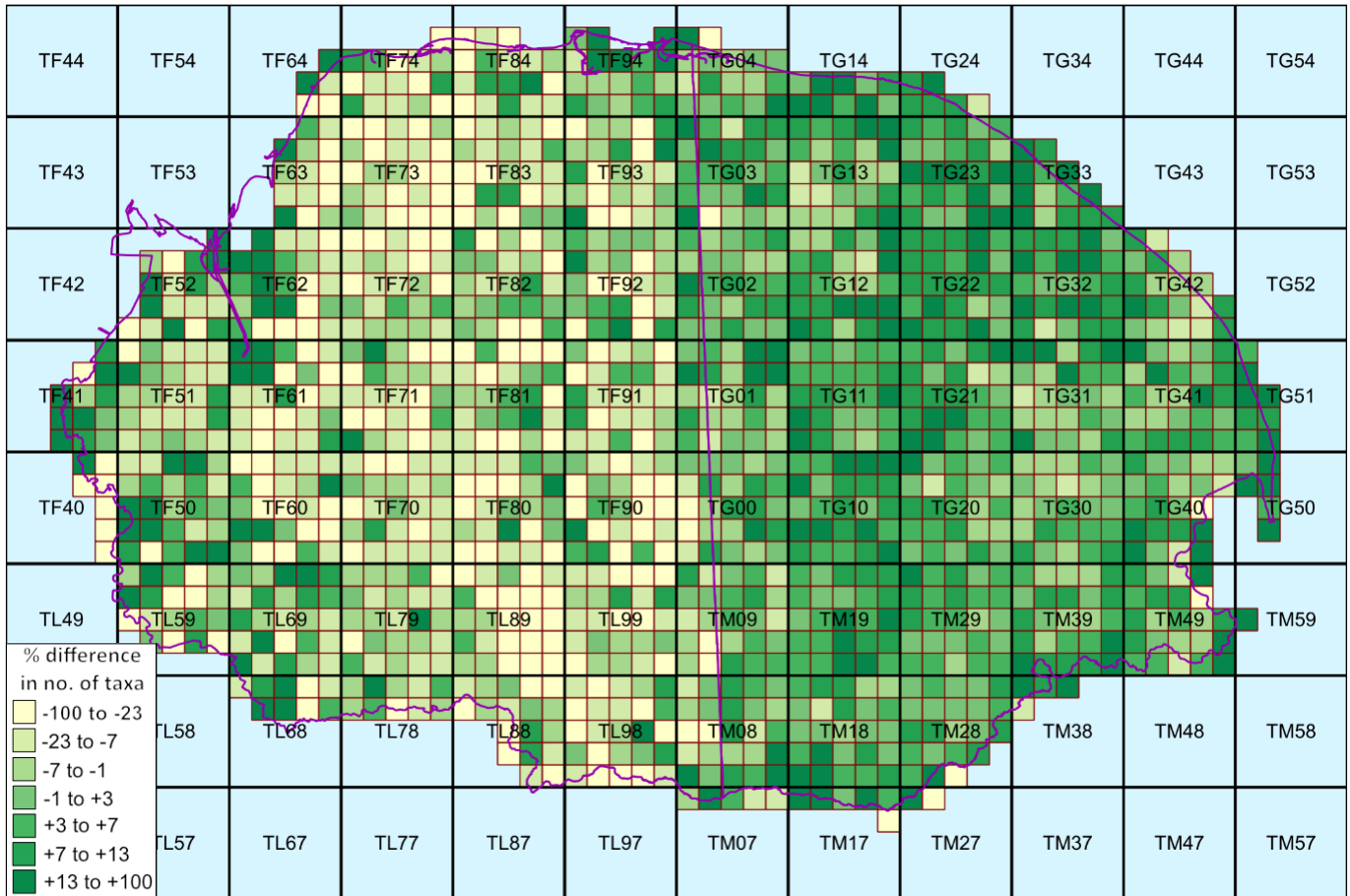


Fig. 3 The difference between the number of taxa recorded in each tetrad between 2000 and 2024 less the number between 1985 and 1998 expressed as a percentage of the total of the two (giving a range between -100% and +100%)

Another way of looking at the progress towards a comparable level of coverage is to look at the distribution of the counts across the categories on the map. These are presented in figures 4 and 5. Intuitively you would expect that with even coverage the number of taxa per tetrad would approach a normal distribution. This is more or less the case in the first period but not so in the second where the distribution is skewed towards the lower end.

The mean number of taxa per tetrad for the first period is 267 and for the second is 263. At first sight, these might seem to be comparable but for the first period, the mean more or less coincides with the peak of the distribution, which is what might be expected, whereas for the second period the mean is somewhat on the

lower side of the peak. Furthermore the maximum number of taxa in a tetrad was 626 in the first period and 683 in the second, which might suggest greater recording intensity but the total number of different taxa recorded in the first period is 2020 whereas in the second period it is was 2459. This is a 22.7% increase - we are obviously recording a greater range of taxa.

What this all means is that there is more work to do, and a brief glance at figures 2 and 3 tell us that the bulk of this is in the west, the larger part of the county .

The two vice-counties span 5,666 monads - that's 2,538 for v.c.27 and 3,057 for v.c.28 with 71 shared. It includes 487 partial monads that are on the coast or the external vice-county boundaries (occasionally both).

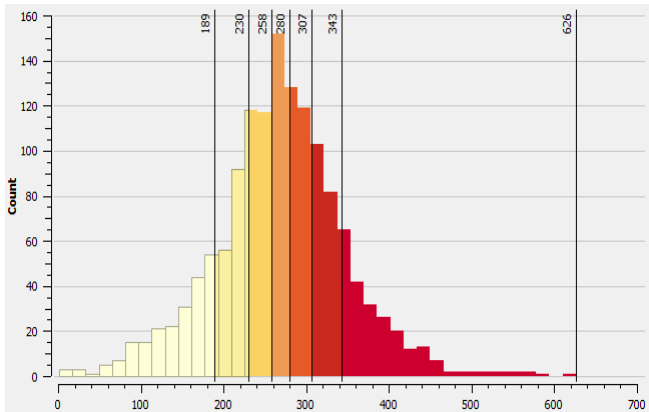


Fig. 3 The distribution of the taxa per tetrad within the categories in figure 1 (1987-1998)

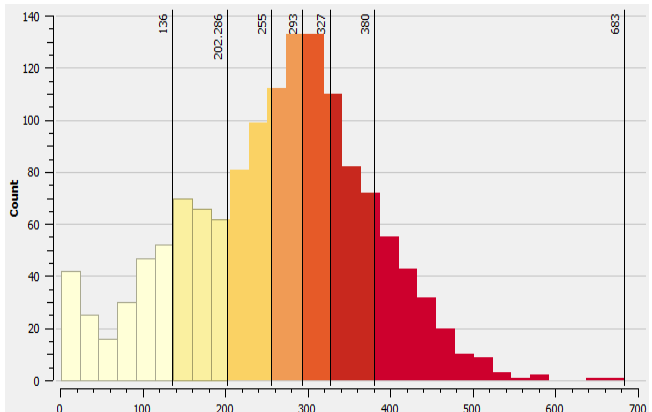


Fig. 4 The distribution of the taxa per tetrad within the categories in figure 2 (2000-2024)

Recording at different scales

When planning a dot map atlas project, such as a county atlas Flora, one of the things that needs to be considered is the recording unit. This will be governed by the size of the area covered and what is an appropriate dot size within that frame such that the maps fairly represent the distribution of the subject (species) and at the same time are easy to interpret. It will also be governed by the practicality of collecting data within the timescale of the project with thorough and even coverage.

Assuming we are using the British Ordnance Survey grid we need to choose a unit that fits with the grid and that is easy to ascertain in the field. After the 100km 2-letter code, each digit of a grid reference represents a factor of 10 so going down the scale we have a choice of hectad (10km square), monad (1km square), hectare (100m square), 10m square (once known as an 'are') and 1m square. Except for the 1m square, each level can be divided by 4 or 25 and still fit with the grid but only a few make sense. 5km squares (sometimes referred to as quadrants) suffixed by SW, NW, NE and SE have been used but have not proved popular. 2km squares (tetrads) suffixed according to the 'DINTY' system (see figure 5) have been popular for county atlas Floras.

E	J	P	U	Z
D	I	N	T	Y
C	H	M	S	X
B	G	L	R	W
A	F	K	Q	V

Fig.5 The DINTY system

A map dot indicates the presence of the specific taxon at the chosen precision in the specific time frame. The presence of the taxon may represent one or more records including any at a finer precision. So planning a tetrad flora does not mean we only collect tetrad

precision records. If we collected 10m grid-references for every species we encountered, however, we'd never get the job done. It makes sense to select a preferred precision for particular groups of taxa depending on their frequency and conservation interest. Ubiquitous taxa and very common ones might be recorded at the coarsest precision. Less common taxa might be recorded at a finer precision and even finer ones used for uncommon, rare and very rare taxa. Maps for a coarser precision can always be created from records made at finer ones. The difficult bit is to match the coarsest precision to the time necessary to complete the project. Figures 6 to 9 show examples of the use of finer scale dot maps.

With this in mind, in 2008 we amended the recording sheet, which had already been optimised for the county, and split the entry boxes for the less common species into four so we could easily record monad records whilst recording a tetrad. We based this species selection on what we already knew about their frequency and

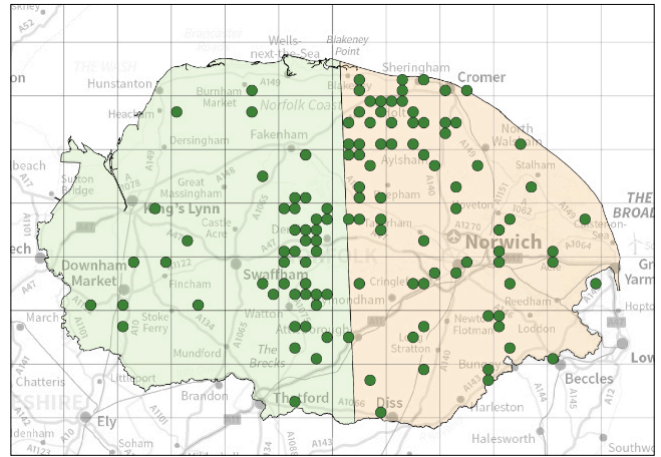


Fig. 6 The distribution of *Carex pendula* Pendulous Sedge in Norfolk from 1985-99 at tetrad precision.

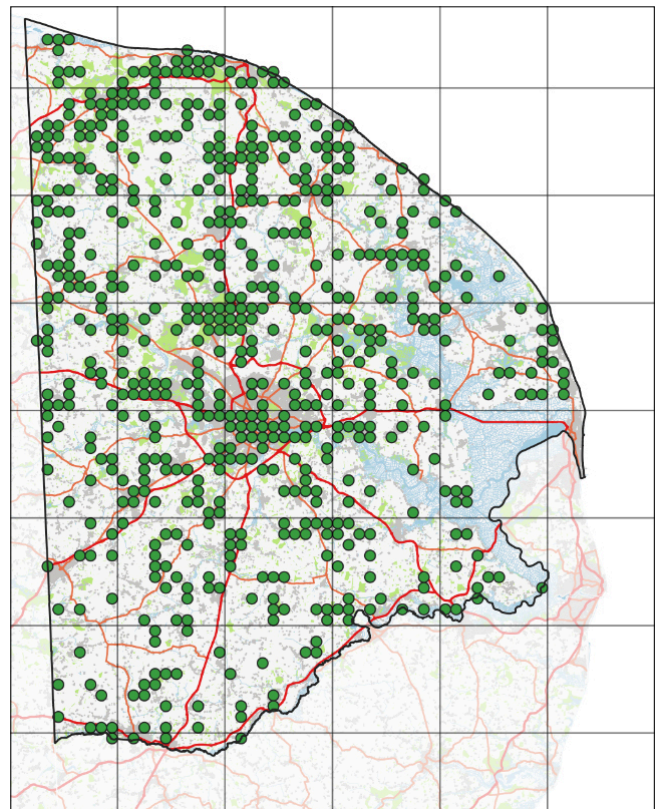


Fig. 7 The distribution of *Carex pendula* Pendulous Sedge in East Norfolk, v.c. 27 from 2000-24 at monad precision.

distribution from Beckett *et al.* and our recording efforts since 2000. A list of monad-level taxa was made and has since had a few additions. Of course we had already been recording monad precision records for sites as well as finer precision grids for scarcer species (which do not have boxes on the recording sheets), but not on the basis of systematic coverage at monad scale.

We are planning to update the Flora of Norfolk sooner rather than later as our data from early post-2000 is getting a little out of date and we are now approaching the end of recording for the update. It would be good to make use of the monad data we have already gathered so increasing systematic coverage at the monad scale is another urgent objective.



Fig. 8 The distribution of *Filago germanica* Common Cudweed in the Norwich area (TG10,TG11,TG20, TG21) at hectare precision

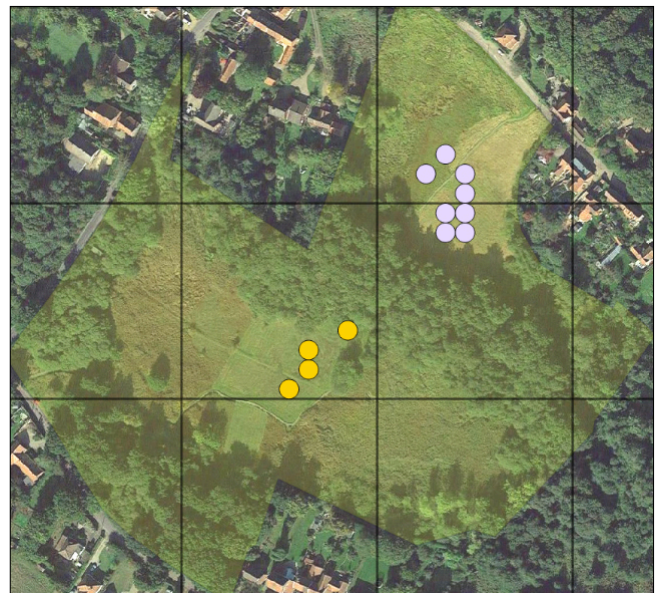


Fig. 9 The distributions of *Carex pulicaris* Flea Sedge (yellow dots) and *Cirsium dissectum* Meadow Thistle (lilac dots) on Southrepps Common SSSI in 2023 at 10m precision. The black lines delineate the hectares.

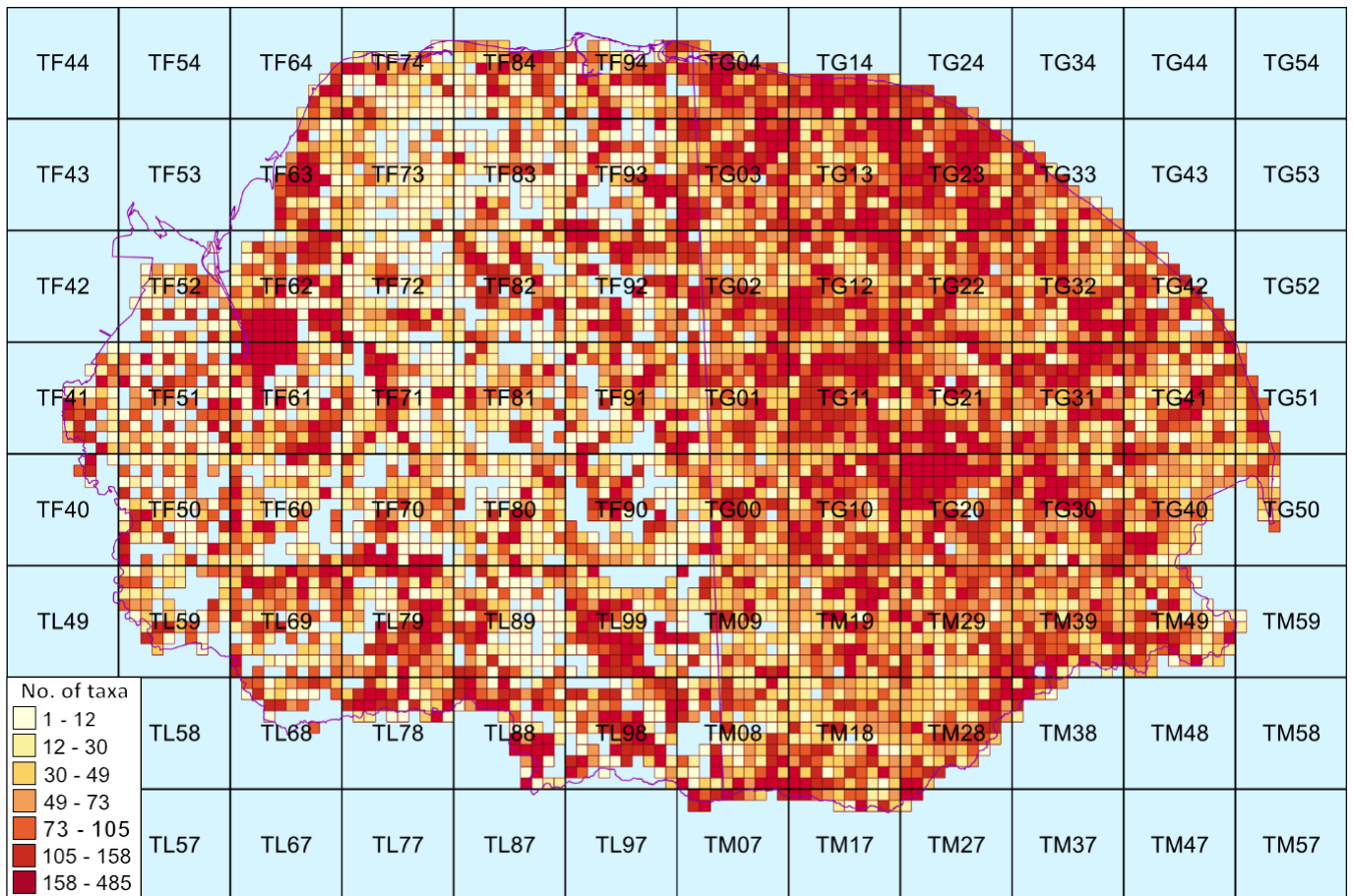


Fig. 10. The number of taxa recorded in each monad between 2000 and 2024

Monad recording in the paler monads will be very welcome, especially the pale blue ones, which have zero monad records, and those in the first two categories which have less than 30.

Acknowledgements: The maps were created using QGIS and Tombio. Figures 6 to 8 use MiniScale® and OS Open Zoomstack, which contain OS data © Crown copyright and database right 2024

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'Missing Monads' - Under-recorded Monads *Janet Higgins and Bob Ellis*

The seven missing monad meetings in 2023 were so successful, we arranged another seven meetings in 2024 to target under recorded areas. Just to recap, the aim of the meetings is to focus on monads with a low number of "qualifying species". These are around 450 species which have been normally recorded at the monad or hectare level.

In the seven meetings in 2024, overall, we recorded in 31 monads and made 4,654 records, an average of 150 per monad and a total number of qualifying species of 376. A summary of the increase in the numbers of qualifying species recorded in each monad is shown in Figure 1. This represented an increase of 84% and 96% with an average of 90%. The comparable figures for 2023 were 74% to 93% with an average of 86%. The higher percentage for 2024 was due to the average starting number of species being only five compared to eight for 2023, in other words, we were targeting monads with fewer species in 2024.

There are many factors influencing the number of qualifying species recorded per monad, the main ones being access and the range and type of habitats. We recorded the highest number of species in the urban monads TG3118 and TG3417 in the Hoveton / Horning area, and TG1102 and TG1203 in Wymondham. Thank you to Enid for recording in the Wymondham monads earlier in the year, this contributed to the high number of records for these monads. We also recorded a high number of qualifying species in TM0881 in the Bressingham area, although this was not in an urban area, there was good access and we found a few garden escapes from the houses alongside the road. Typical garden escapes recorded were the neophytes *Alcea rosea*, *Aquilegia vulgaris*, *Centranthus ruber*, *Euphorbia lathyris*, *Euphorbia oblongata*, *Calendula officinalis*, *Campanula persicifolia* and *Campanula poscharskyana*.

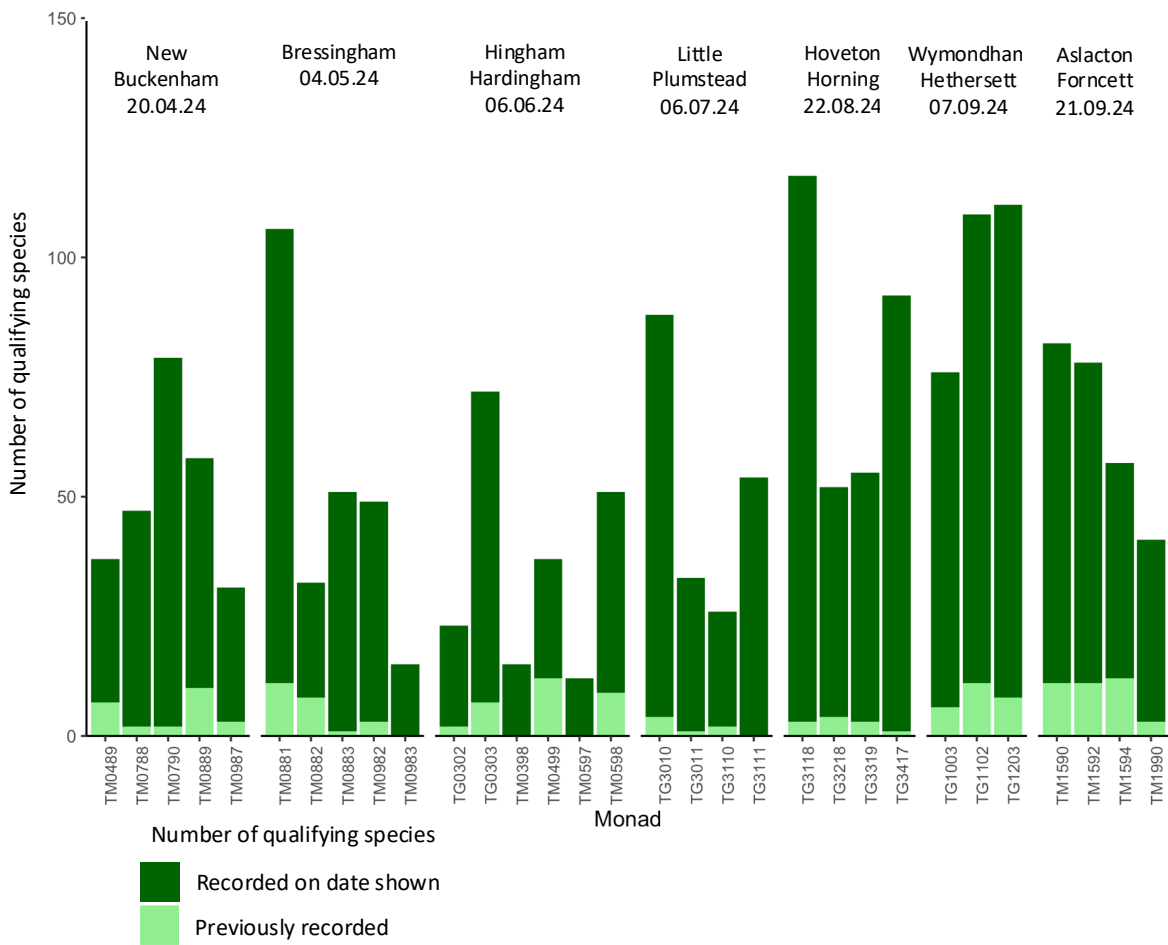


Figure 1. Increase in the number of qualifying species per monad

Each bar shows the total number of qualifying species recorded in each monad since 2000.

We compared the most commonly recorded qualifying species (measured by the total number of monads in which they were recorded) between 2023 and 2024 as detailed in Table 1. Six species were the same over both years, all being recorded in at least 18 monads. Notable differences were *Pteridium aquilinum*, which was 8th in 2023 compared to 101st in 2024 (6 monads) and *Veronica serpyllifolia* which was 10th in 2024 compared to 121st (5 monads) in 2023.

2023		2024	
<i>Centaurea debeauxii</i>	30	<i>Rosa canina sensu stricto</i>	23
<i>Arum maculatum</i>	22	<i>Centaurea debeauxii</i>	22
<i>Rosa canina sens.str.</i>	21	<i>Brachypodium sylvaticum</i>	21
<i>Silene dioica</i>	21	<i>Mercurialis perennis</i>	21
<i>Brachypodium sylvaticum</i>	20	<i>Arum maculatum</i>	20
<i>Lactuca serriola</i>	20	<i>Juncus bufonius</i>	19
<i>Geranium rotundifolium</i>	19	<i>Silene latifolia</i>	19
<i>Pteridium aquilinum</i>	19	<i>Stellaria holostea</i>	18
<i>Tamus communis</i>	19	<i>Tamus communis</i>	18
<i>Silene latifolia</i>	18	<i>Veronica serpyllifolia</i>	18

Table 1 The top ten most commonly recorded qualifying species according to the total number of monads per species in 2024 (31 monads) compared to 2023 (35 monads)

Amongst the qualifying species, we recorded 15 species of conservation concern (SOCC)¹ and 41 Norfolk axiophytes¹ as shown in Table 2 (a total of 51 species as five species are both axiophytes and SOCCs). Axiophytes² are “worthy plants” - the 40% or so of species that arouse interest and praise from botanists when they are seen. They are indicators of habitat that is considered important for conservation, such as ancient woodlands, clear water and species-rich meadows.

Thank you to the following recorders:

Marilyn Abdulla, Mike Ball, Enid Barrie, Dorothy Casey, Emily Costello, George Croucher, Tim Doncaster, Mary Ghullam, Tim Holt-Wilson, Bob Leaney, Jo Parmenter, Meg Miller, Sarah Morrison, Shane Plant, Alex Prendergast, Suki Pryce, Stuart Rogers, Ian Senior and Ian Woodward.

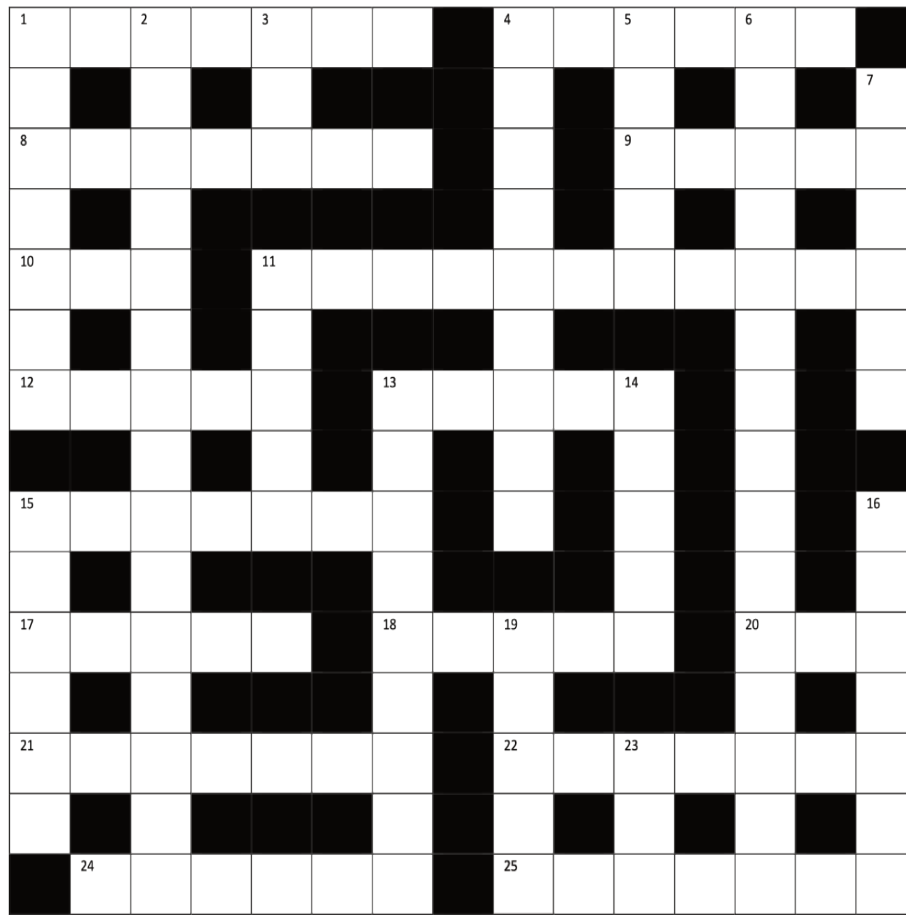
References

- https://www.norfolkflora.org.uk/species_lists
- <https://bsbi.org/axiophytes>

Taxon	Total*	England Red List	Norfolk Scarcity
<i>Knautia arvensis</i>	11	NT	Not scarce
<i>Fragaria vesca</i>	7	NT	Not scarce
<i>Carex flacca</i>	6		
<i>Leontodon saxatilis</i>	5		
<i>Ophrys apifera</i>	4		
<i>Polypogon monspeliensis</i>	4	LC	Not scarce
<i>Rosa tomentosa</i>	4		
<i>Carex sylvatica</i>	3		
<i>Pimpinella saxifraga</i>	3		
<i>Trifolium arvense</i>	3		
<i>Agrimonia procera</i>	2		
<i>Centaurea scabiosa</i>	2		
<i>Hypericum hirsutum</i>	2		
<i>Kickxia elatine</i>	2		
<i>Mentha arvensis</i>	2	NT	Not scarce
<i>Spergularia marina</i>	2		
<i>Trifolium striatum</i>	2		
<i>Apium graveolens</i>	1		
<i>Athyrium filix-femina</i>	1		
<i>Bromus secalinus</i>	1	NT	Not scarce
<i>Centaurea erythraea</i>	1		
<i>Chenopodium murale</i>	1	EN	Scarce
<i>Clinopodium ascendens</i>	1		
<i>Cruciata laevipes</i>	1	NT	Not Scarce
<i>Daphne laureola</i>	1		
<i>Dryopteris carthusiana</i>	1		
<i>Echium vulgare</i>	1		
<i>Eleocharis palustris</i>	1		
<i>Helleborus viridis</i>	1	LC	Scarce
<i>Hyacinthoides non-scripta</i>	1		
<i>Kickxia spuria</i>	1		
<i>Leontodon hispidus</i>	1		
<i>Lepidium campestre</i>	1	NT	Not scarce
<i>Medicago polymorpha</i>	1	LC	Scarce
<i>Plantago media</i>	1		
<i>Poa nemoralis</i>	1		
<i>Polystichum setiferum</i>	1		
<i>Prunus padus</i>	1		
<i>Rosa rubiginosa agg.</i>	1		
<i>Rosa stylosa</i>	1	LC	Rare
<i>Salix triandra</i>	1		
<i>Salvia verbenaca</i>	1	NT	Not scarce
<i>Sonchus palustris</i>	1	LC	Not scarce
<i>Stachys arvensis</i>	1	NT	Not scarce
<i>Thymus pulegioides</i>	1		
<i>Torilis nodosa</i>	1		
<i>Trifolium glomeratum</i>	1	LC	Not scarce
<i>Typha angustifolia</i>	1		
<i>Veronica anagallis-aquatica agg.</i>	1		
<i>Veronica polita</i>	1		
<i>Viola reichenbachiana</i>	1		

Table 2 Axiophytes (green) Species of conservation concern (red) Both being shown in brown.

* Number of monads
 EN=Endangered
 NT=Near Threatened
 LC= Least Concern



Answers to the 2023 Norfolk Flora Group Crossword

1	F	L	E	A	B	A	N	E		4	A	5	C	H	6	E	N	E	
	E		L		L								H		X				
7	S	A	M	B	U	C	U	S		8		9	C	A	N	A	D	A	
	C				E		R		10			D		L		M			
11	U	L	E	X					12	B	R	O	O	K	L	I	M	E	
	E				13	F	A	U								N			
			14	S	I	L	E	N	E	G	A	15	L	L	I	C	A		
				T		I							I		N				
16	C	R	E	E	P			17	N		18	P		19	L	E	G		
	O		L						O		E			Y				20	A
21	C	O	L	T	22	S	F	O	O	T				23	S	24	M	U	T
	O		A			E		N		I						I			T
	N		R			D			25	H	O	T	26	T	O	N	I	A	
	U		I			G				L			I		O				R
27	T	E	A	S	E	L			28	H	E	S	P	E	R	I	S		

Looking forward to 2025 field season

Jo Parmenter

Holmes Wood, Hindolveston Wood and Fulmodeston Severals
 Gt Yarmouth South Denes (a joint event with the bryological group)
 Taraxacum Workshop at RSPB Strumpshaw
 Dereham Rush Meadow and Moorgate Woods
 Wendling Beck Enhancement project sites
 Booton Meadow & Ash Plantation
 Rubus Workshop: Red List species at Buxton, Marsham & Cawston Heaths
 Chestnut Farm Langley fen restoration project
 Chippenham Fen & Kingfisher Bridge
 Introduction to Wildflowers at NWT Upton Fen reserve
 Eyebright Workshop at NWT East Winch Common
 Manor Farm Shropham
 Grimston Warren