A Survey of Galls:
Wanstead Park and Flats

June 2017 - February 2018

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Introduction
I started surveying plant galls on my local 'Patch' (Wanstead Park and Wanstead Flats) in the summer of 2017. The following account is a summary of the survey as it stands at the beginning of 2018. I have found and photographed 59 galls with different causer species, of which 38 are new to the Patch (when compared with records on the Wanstead Wildlife website and spreadsheets held by the Wren Conservation Group), and one is a new species for Epping Forest as confirmed by the City of London entomologists.

I am relatively new to cecidology and have performed identification largely using the key method with the book, 'British Plant Galls' (2011), by Redfern, Shirley, and Bloxham. This has been invaluable. Some tricky specimens have been confirmed by experts, but none of the causers have been subject to microscopic examination, so any errors are my responsibility alone and I would welcome any corrections. However, I should add that this summary only includes galls where I am confident in the identification and where alternate possibilities are limited (with one exception which is scrutinised below). I have found other galls locally which I have simply not been able to key to specific level.

Two other caveats are worth mentioning before the report begins. First, is that fact that I am more comfortable in identifying trees than most other forms of plants and so the heavy bias towards galls on trees is likely largely due to this personal prejudice and limitation. This, in turn, means this survey is, by no means, exhaustive, comprehensive, or fully 'scientific'. It is, as far as I am aware, however, the most comprehensive survey of plant galls conducted at this particular location in East London. For that reason, it seems that this report is worth writing and sharing with those who have in interest in the biodiversity of the local area, or in plant galls found in London or Epping Forest. I hope to significantly add to the survey in coming years.

I have decided to organise this report by the gall causer species rather than by host. I can provide my supporting list, notes, and photos to anyone who is interested. All photos included in this report are my own.

Finally, I wish to be clear that this report is simply a summary of galls found during my survey work, I do not look to make scientific analysis, conclusions, or comparisons. Having said this, I believe this work does raise one or two questions which would be worth further investigation and research. I have attempted to make this report as accessible as possible in case anyone locally, with little or no knowledge of plant galls wishes to pick it up.

The survey

There are five invertebrate families of gall causer that I have found in this survey: aphids, midges, wasps, sawflies, and mites. I have also found one bacteria-caused gall, and four fungal. I am also aware of one more gall found locally which I have not yet photographed; this is plant-caused plant gall of mistletoe.

Although the survey is organised by causer, it is worth touching on the hosts as well. The 59 galls have been found on a total of 24 plant hosts. It should be no surprise that oak (Quercus) is the most galled plant genus, with 14 types of gall (12 caused by wasps). In joint second place come the maples (*Acer*), birches (*Betula*), willows (*Salix*), and limes (*Tilia*), each with four types of gall that I have found on them. The following matrix gives a more visual sense of how the most commonly galled hosts have been affected by the causers I have found. Why do the *cynipidae* wasps seem to favour oak over all other plants? Why is it the sawflies seem to favour willow leaves? I simply do not know.

	Acer	Alnus	Betula	Quercus	Salix	Tilia	Ulmus	Other	**Total**
Aphid							2	1	**3**
Midge			2	1	1	2		6	**12**
Mite	4	3		1		2	1	10	**21**
Wasp				12				2	**14**
Sawfly					3			1	**3**
Fungi								4	**4**
Bacteria			1						**1**
Plant								1	**1**
Total	**4**	**3**	**3**	**14**	**4**	**4**	**3**	**24**	**59**

<u>Galls caused by aphids</u>

I have only found three galls caused by the insect family, *Aphididae*, the aphids; two of which were on elm.

Through the year, I have found several pouch galls on elm leaves caused by the aphid, *Eriosoma lanuginosum*, including the two shown in different stages in Image 1 which I took in June in the tree-lined path behind the houses on Belgrave Road and by the Western Flats football pitches. Sharp eyed readers may have noticed that there is also likely to be another leaf roll gall in the first photo in Image 1, but I did not scrutinise this at the time as I was focused on the impressive pouch gall.

The other unmistakeable gall found on elm leaves and caused by aphids is the club-like gall caused by *Tetraneura ulmi*. This gall does not seem to be common locally but I have found a

small number in the summer including an impressive specimen near the Roding and the Old Sewage Works which was at least at the upper end of the size range given by Redfern and Shirley (7-15mm).

The third and final gall I found caused by an aphid was on a very different host; mugwort. In the Old Sewage Works, mugwort leaves afflicted by the purple lumps and leaf twisting caused by *Cryptosiphum artemisiae*, was very common throughout much of the summer.

Gall midges and other flies

All of the twelve galls I found through the year caused by dipterans belong to the aptly named *Cecidomyididae* family (Cecidia is the botanical name for galls). These are gall midges or gnats and tend to be very small indeed - rarely more than 3mm in length. Luckily, the galls they create - and can often be identified by - are rather larger and more noticeable.

The midges gall a broad range of plants but the species will often specialise on a single plant species - which certainly assists with identification. The genus of midges causing galls most commonly found on the patch is *Dasineura;* a genus with several hundred species, of which I have found four on the Patch:

- Ash leaves with pouches along the leaflets caused by *Dasineura fraxini*
- Wild rose leaves folded and heavily thickened containing the larvae of *Dasineura rosae*
- Small-leaved Lime where the fresh terminal leaves are folded and crinkled due to *Dasnineura thomasiana* (with the larva shown in the unfolded leaf in the photo in Image 2)
- On my own street, strictly speaking just off the patch, there are planted specimens of Honey Locust trees with leaves galled by the *Dasineura gleditchiae* - apparently a relatively recent arrival currently spreading North from Southern England.

The seeds found in birch catkins are sometimes galled locally by *Semudobia betulae* and *Semudobia tarda* (causing slightly different shaped swellings to the seeds).

Mites

The most commonplace galls I have found on the Patch are caused by some of the smallest of gall-causing invertebrates: mites. The gall mites, or *Eriophyidae*, is a family of several thousand species - with ample scope, apparently, for thousands more to be discovered. I have 21 galls on my patch list caused by this family.

Of all the leaf roll galls, I have seen none as tightly curled or as perfectly formed as those on beech leaves caused by the mite, *Acalitus stenaspis* (Image 3).

The most common genus of mites are the *aceria* which cause eleven galls found on the Patch. Many of the pustule or erinea galls on the leaves of the maple/sycamore family are caused by the *Aceria* mites with their generic name clearly coming from '*Acer*' (maple). These include:

- *Aceria cephalonea*, which cause red pustules on sycamore.
- *Aceria macrochela*, another pustule causer on the veins of field maple.

- The aptly named, *Aceria myriadeum*, which cause a myriad of tiny red pustules exclusively on field maple.
- The sycamore specialist, *Aceria pseudoplatani*, causes erineum (hairy patches) on the underside of the leaves, although Redfern *et al* accept that there may be other causers of similar galls.

Other Aceria-caused galls of note on the Patch include:

- *Aceria artemisiae* causes hairy red pustules, that could be casually confused with the aphid-caused gall on the same host mentioned above.
- There are two specimens of walnut tree on Wanstead Flats. I have, in turn, found one gall specimen, a bright swelling, on a high leaf of one of these trees that will have been caused by *Aceria erinea*.
- Ash keys are commonly, and very distinctively, afflicted by the 'cauliflower gall' caused by *Aceria fraxinivora* shown in Image 4 taken in Wanstead Park.

The tiliae (lime trees) are commonly afflicted by noticeable nail galls, caused by mites from the genera, *Eriophyes*:

- Large-leaved lime is galled, suitably, with the largest nail galls caused by *Eriophyes tiliae*.
- Small-leaved Lime is galled by *Eriophyes lateannulatus* by somewhat smaller and more rounded galls. It is worth noting that both gall causers afflict the hybrid, common lime which is frequently found on the Patch.

Eriophyes mites also gall blackthorn causing hairy pustules along the leaf midrib. Different species can cause similar looking galls, but expert members of the British Plant Gall Society helped me gain reasonable certainty that the ones I have found on several occasions near Bush Wood are caused by *Eriophyes homophyllus* (see Image 5):

Similarly, I have found beech leaves in Wanstead Park with lumps arranged either side of the midrib with underside erinea caused by *Eriophyes inagulis*.

<u>Wasps</u>

Galls caused by wasps certainly include some of the best known to the casual wildlife observer and act as an entry point of interest in cecidia for many of us. After mites, wasp-induced galls form the next largest contingent with 14 galls found so far, 12 of which are on oak - the UK's most galled plant genus.

The two most easily-found galls in the Wanstead area are the well known 'marble gall' (*Andricus kollari*) and the 'knopper gall' (*Andricus quercuscalicis*). The number of specimens of both of these galls locally must be truly vast.

The 'ramshorn gall', caused by *Andricus aries* was first found in the UK twenty years ago and is extremely common across the oaks on the Wanstead Flats and Park. Similarly, the 'artichoke gall' on buds, caused by the sexual generation of *Andricus foecundatrix*, is easily found on almost every oak and is impressively distinctive (See Image 6).

Different (a)sexual generations of the wasp *Andricus curvator* gall oak in different ways, with galls caused by the sexual generation found as swellings on the leaves in Bush Wood.

In my first year of studying the galls of the Wanstead Flats and Park, my most significant, and unwelcome for many, find was on one of our ancient Bush Wood sweet chestnuts. The gall caused by the wasp, *Dryocosmus kuriphilus*, otherwise known as the 'oriental chestnut gall wasp'. This was confirmed by entomologists as the first record for Epping Forest. I have included a photo in Image 7.

Wanstead oak leaves are frequently afflicted, sometimes completely infested, by button-like galls caused by the Neuroterus wasps. 'Silk button' (*Neuroterus numismalis*) and 'oak spangle' galls (*Neuroterus quercusbaccarum*) are both extremely common, whilst I have, oddly, not yet found 'smooth spangle' galls (*Neuroterus albipes*) in the local area (although records from about a decade ago do exist). I found one specimen of a gall caused by *Neuroterus anthracinus* on pedunculate oak in the summer, and a couple of specimens caused by *Neuroterus saliens* on one of our many turkey oak specimens.

'Oak apples' (caused by the wasp, *Biorhiza pallida*) have been found and are impressive, but I will not be alone in thinking that one of the most impressive galls of all is found on the rose family hosts and is caused by *Diplolepsis rosae*, although much better known by its common name, 'robin's pincushion' (see Image 8).

<u>Sawfly</u>
I have found three galls in the local area caused by sawflies, and all three of them can be found on the leaves of the *Salix* family of trees (willows):

- *Pontania bridgmanii* and *Eupontania pedunculii* both cause galls on sallow leaves across the local area; and,
- *Pontania proxima* causes bean-like galls on crack willow leaves.

This concludes a summary of the invertebrates that cause plant galls in the local area that I have found to date. However, it is not the end of the story regarding plant galls as we have many that are caused by non-animal organisms.

<u>Fungi</u>
Many of the *Rubus* (blackberry) plants are afflicted by rust spot-like fungi such as *Phragmidium violaceum*, but a more conclusive 'gall' is formed by *Kuehneola uredinis*. Whilst both are common locally, I have included the latter, but not the former, in my list of galls.

Unmistakable galls are caused by the fungi, *Gymnosporangium sabinae*, on pear leaves (including in my garden) which is apparently just one stage of a highly complex reproductive cycle that also involves juniper. The orange rust spots are distinctive on the upperside of the leaf, whilst the udder-like, spore-releasing 'aecia' on the underside are even more distinctive. A similar, but less impressive, gall (*Puccinia smyrnii*) is found on the introduced plant, alexanders (*Smyrnium olusatrum*).

Bacteria

It is likely that there are many plant galls caused by bacteria locally, but the only clear examples I have been willing to record are huge tumour-like cavity and growths on some of our trees caused by *Agrobacterium tumefaciens* which can be found on some of the oldest and most impressive birches locally planted along the edge of Perch Pond in Wanstead Park.

Plant

Finally, it is worth remembering that plants can also be causers of plant galls, with the most famous example being found locally: mistletoe.

Appendix 1: Full list of gall causers and hosts found in 2017 on Wanstead Flats and Park. Locations given of where first found by James Heal.
Key:
BW - Bush Wood
OSW - Old Sewage Works
WF - Wanstead Flats
WP - Wanstead Park

Causer type	Gall causer	Gall host	Location/date
Aphids	*Cryptosiphum artemisiae*	*Artemisia*	OSW 24/06/17
	Eriosoma lanuginosum	*Ulmus*	BW 17/06/2017
	Tetraneura ulmi	*Ulmus*	OSW 02/07/2017
Midges	*Asphondylia sarothamni*	*Genista*	WP 24/06/17
	Contarinia tiliarum	*Tilia*	BW 11/06/2017
	Dasineura fraxini	*Fraxinus*	WP 29/07/2017
	Dasineura gleditchiae	*Gleditsia*	Barclay Rd 24/06/2017
	Dasineura rosae	*Rosae*	OSW 08/07/2017
	Dasineura thomasiana	*Tilia*	BW 24/06/2017
	Iteomyia major	*Salix*	WF 08/07/2017
	Macrodiplosis pustularis	*Quercus*	WP 24/06/2017
	Obolodiplosis robiniae	*Robinia*	BW 09/07/2017
	Semudobia betulae	*Betula*	WF 27/09/2017
	Semudobia tarda	*Betula*	WF 27/09/2017
	Zygiobia carpini	*Carpinus*	BW 09/07/2017
	Acalitus brevitarsus	*Alnus*	WP 15/07/2017
	Acalitus stenaspis	*Fagus*	WP 15/07/2017
	Aceria artemisiae	*Artemisia*	OSW 15/07/2017
	Aceria cephalonea	*Acer*	BW 24/06/2017
	Aceria erinea	*Juglans*	WF 08/07/2017
	Aceria fraxinivora	*Fraxinus*	WP 24/06/2017
	Aceria ilicis	*Quercus*	BW 17/06/2017

Mites	*Aceria macrochela*	*Acer*	WF 08/07/2017
	Aceria myriadeum	*Acer*	WF 17/06/2017
	Aceria nervisequa	*Fagus*	WP 18/06/2017
	Aceria pseudoplatani	*Acer*	WP 24/06/2017
	Aceria tenella	*Carpinus*	WP 24/06/2017
	Aceria ulmicola	*Ulmus*	BW 17/06/2017
	Aculops fuchsia	*Fuchsia*	Barclay Rd 08/07/2017
	Cecidophyes nudus	*Geum*	Barclay Rd 11/09/2017
	Eriophyes homophyllus	*Prunus*	BW 08/10/2017
	Eriophyes inangulis	*Alnus*	WP 15/07/2017
	Eriophyes laevis	*Alnus*	WP 15/07/2017
	Eriophyes lateannulatus	*Tilia*	BW 24/06/2017
	Eriophyes tiliae	*Tilia*	BW 24/06/2017
	Phyllocoptes eupadi	*Prunus*	BW 08/10/2017
Wasps	*Andricus aries*	*Quercus*	BW 24/06/2017
	Andricus curvator	*Quercus*	BW 24/06/2017
	Andricus fecundator	*Quercus*	WP 24/06/2017
	Andricus grossulariae	*Quercus*	WF 09/09/2017
	Andricus kollari	*Quercus*	WF 17/06/2017
	Andricus quercuscalicis	*Quercus*	WF 17/06/2017
	Biorhiza pallida	*Quercus*	WF 07/05/2017
	Cynips divisa	*Quercus*	WF 16/07/2017
	Diplolepsis rosae	*Rosae*	OSW 18/07/2017
	Dryocosmus kuriphilus	*Castanea*	BW 09/07/2017
	Neuroterus anthracinus	*Quercus*	WF 17/06/2017
	Neuroterus numismalis	*Quercus*	WF 17/06/2017
	Neuroterus quercusbaccarum	*Quercus*	WF 17/06/2017
	Neuroterus saliens	*Quercus*	WF 27/09/2017
	Pontania bridgmanii	*Salix*	WF 10/07/2017

Sawflies	*Pontania pedunculi*	*Salix*	WF 02/07/2017
	Pontania proxima	*Salix*	OSW 02/07/2017
Fungi	*Gymnosporangium sabinae*	*Pyrus*	Barclay Rd 19/06/2017
	Kuehneola uredinis	*Rubus*	WF 08/07/2017
	Puccinia smyrnii	*Smyrnium*	WF 03/02/2018
	Puccinia malvacearum	*Malvacearum*	OSW 05/08/2017
Bacteria	*Agrobacterium tumefaciens*	*Betula*	WP 24/06/2017

Appendix 2: Images (all taken by me in 2017)