

Wyre Forest Study Group

Wyre Forest Oak Fogging Project

Natural England

ED. ROSEMARY WINNALL



Fogging tree 3

Katrina Dainton

Introductory Notes by Mick Blythe

In the summer of 2015 Katy Dainton and Alice James of Natural England sampled the canopy of three oak trees in the Wyre Forest using the fogging technique. In this technique a powered fogger is used to blow a fog of insecticide up through the canopy of the tree and the dead or stunned arthropods are collected in funnels or on tarpaulins set out on the ground below.

Tree 1, an 80-100 year old oak tree with no woody understorey at SO76182 74811 was sampled on 16/06/2015. The fogger used was a PulsFOG K-10-SP portable thermal fogger and the insecticide a 10% solution of Permethrin. 15 tarpaulins were set out beneath the chosen tree the day before. They were suspended from a stake at each corner and weighted in the centre with a roofing tile.

The fogging operation started at 5:40 a.m. when the air was expected to be at its most still and continued for 6 minutes. It was found necessary to move the fogger around the tree in order to get a more complete cover. Dead and dying arthropods began dropping onto the tarpaulins immediately after the fogging and were collected with soft paintbrushes and stored in pots of 70-80% ethanol. It was necessary to ignore active flies which landed on the tarpaulins but were evidently not from the tree canopy. Collecting continued for 3 hours.



The samples collected were excellent, due to both the success of the operation and the nature of the oak tree which had a number of exciting dead and rotten branches low down in the canopy.

Tree 2 was a 100 year old oak tree in the PAWS section of Longdon Wood, SO75141 77757, sampled on 24/06/2015. The understorey was ankle to knee length bracken and bramble. The same method was employed except that the tarpaulins were set out at 5:00 a.m. on the morning of the fogging. The fogging was carried out at 5:40 as Tree 1.

This experiment was less successful. The insecticidal fog would not rise higher than the lower third of the tree canopy and the upper regions were untouched. Many interesting specimens were collected but overall the result was disappointing.

The third fogging was carried out on 3/07/2015. Tree 3 was another oak from the PAWS section of Longdon Wood; possibly a younger tree, growing in a more exposed position near the path at SO75368 77228. Compared with the previous trees the canopy was more dense and extended further down the trunk. The understorey of saplings, bramble and heather was also taller and denser, from knee to waist high, posing problems with the placing of the tarpaulins.

The fogging was very successful, the insecticide filled the entire canopy from bottom to top and the arthropod samples were the richest of all the sites in numbers and diversity. Unfortunately, though the morning was dry and the air very still it had rained the day before and the vegetation was still moist. The blast of the fogger dislodged a rain of moisture from the canopy which wetted the tarpaulins and many of the specimens suffered damage from being scraped off the wet collecting surface.

In addition 3 Vane traps were erected using pulleys in oak trees on 19th June 2015 with help from Essie Beer-Pearce. These were not far from the fogging sites (see map) and they were left for 17 days, collected on 6th July 2015.

Katy Dainton and Mick Blythe sorted the catch and the following local recorders generously volunteered their help in identifying the specimens: Mick Blythe (Diptera), Caroline Uff (Coleoptera), Michelle Furber (weevils), Geoff Trevis (aculeate Hymenoptera), Keith Fowler (Hemiptera and Psocoptera), John Partridge (spiders and harvestmen), Gary Farmer, (Orthoptera and associated insects), Pete Boardman (springtails), and Martin Skirrow (thrips). The only large group of insects which was not attempted was the Parasitica.



Diptera by Mick Blythe

The tree canopies, arguably the most significant part of the woodland ecosystem, are an unfamiliar environment to a ground-based naturalist, and any attempt to investigate them is exciting and potentially valuable. What we would really like to know is:

- what are the predominant fly species in the canopy,
- to what extent are they different from the species we see at ground level,
- are there species considered rare at ground level which have been living in the tree canopy all the time?

Which are the predominant fly species in the canopy?

It will be seen from table 1 that the richest sample came from tree 3. This tree is possibly younger and healthier than the others with dense leafage extending from bottom to top, the well-clad lower branches extending outwards in a wide apparent browsing line. The fogging of this tree was also particularly successful, involving the full depth of the canopy. Tree 1 had a sparser canopy with dead branches lower down and a more open, clumped foliage. The results from tree 2 have to be interpreted with caution as the fogging did not extend beyond the lower branches.

The leafage of the canopy does not provide a food source for the adult flies other than a browsing surface for honeydew, algae and microfungi. Its main usefulness is providing shelter. However the adult Empididae, Hybotidae and Dolichopodidae are mostly predators of other invertebrates and the leafage is sheltering their prey. This is certainly true of the *Platypalpus* species (Hybotidae). *Tachypeza nubila*, *Drapetis ephippiata*, the *Medetera* species and *Tachydromia umbrarum* are also predators but are more associated with tree bark and are usually found running over the trunks of the trees. *Pseudolyciella stylata* is also a tree bark species and has been associated with tree sap (Alexander, 2002).

The significant fly species in the canopy we take to be those present in the fogging samples in the greatest numbers and/or those species present in more than one of the trees. The larger fly fauna was dominated to a remarkable extent by the families Hybotidae, Dolichopodidae and the smaller Empididae. Small Nematocera (midges) were abundant in the samples, particularly the biting midges, mostly of the genus *Culicoides*, particularly the human-biting *C. obsoletus*. The biting midges (Ceratopogonidae), water midges (Chironomidae) and black fungus gnats (Sciaridae) have yet to be examined.

Phyllodromia melanocephala, a tiny yellow fly with a black head is usually found low down amongst damp vegetation and the leaves of wayside bushes, and not in the startling numbers recorded here. However Collin reports it as quite common on the leaves of dwarf birches at Barton Mills, Suffolk in June 1933. The larvae of *Sciapus platypterus* have been recorded from under bark (Alexander, 2002). It is not uncommon in ground layer and bush vegetation but the numbers found here were remarkable. *Platypalpus luteus* is not one of the common *Platypalpus* species at lower levels though it is not infrequently encountered. In view of the numbers involved all the above may be suspected of being at least to some extent canopy specialists

Table 1: Species present in large numbers or more than one tree

(Species in blue from more than one tree)

		Tree 1	Tree 2	Tree 3	Total	
Limoniidae	<i>Ormosia nodulosa</i>			13	13	
Limoniidae	<i>Molophilus griseus</i>	1		1	2	
Mycetophilidae	<i>Acnemia nitidicollis</i>	1		1	2	
Mycetophilidae	<i>Apolephthisa subincana</i>	2		1	3	
Empididae	<i>Phyllodromia melanocephala</i>		18	286	304	
Empididae	<i>Rhamphomyia longipes</i>		4	32	36	
Hybotidae	<i>Bicellaria intermedia</i>		1	38	39	
Hybotidae	<i>Bicellaria nigra</i>	2	1	2	5	
Hybotidae	<i>Drapetis ephippiata</i>		1	1	2	
Hybotidae	<i>Oedalea holmgreni</i>	58		3	61	
Hybotidae	<i>Platypalpus calceatus</i>	3		1	4	
Hybotidae	<i>Platypalpus claudus</i>	0	1	19	20	
Hybotidae	<i>Platypalpus cothurnatus</i>			17	17	
Hybotidae	<i>Platypalpus longicornis</i>	2		4	6	
Hybotidae	<i>Platypalpus luteus</i>	18		146	164	
Hybotidae	<i>Platypalpus pallidiventris</i>	4		3	7	
Hybotidae	<i>Tachypeza nubila</i>	1	2		3	
Dolichopodidae	<i>Sciapus platypterus</i>	5	2	185	192	
Dolichopodidae	<i>Microphor holosericeus</i>	23			23	
Dolichopodidae	<i>Chrysotus gramineus</i>	8	1	3	12	10/12 females
Dolichopodidae	<i>Medetera impigra</i>	21			21	
Rhagionidae	<i>Rhagio lineola</i>			59	59	
Rhagionidae	<i>Ptolina obscura</i>	15	1	2	18	Nationally notable
Rhagionidae	<i>Chrysopilus cristatus</i>		1	2	3	
Lauxaniidae	<i>Pseudolyciella spp</i>	16		58	74	
Lauxaniidae	<i>Meiosimyza platycephala</i>	4		55	59	
Fanniidae	<i>Fannia polychaeta</i>			59	59	40/59 females
Fanniidae	<i>Fannia sociella</i>	17	2		19	18/19 females
Muscidae	<i>Helina depuncta</i>			22	22	
Muscidae	<i>Helina abdominalis</i>	1		2	3	Nationally notable
Muscidae	<i>Helina impuncta</i>	3		6	9	

and all were more closely associated with the denser foliage of tree 3. On the other hand *Chrysotus*, one of the most abundant genera of small flies in the field and bush layer was found only in small numbers in the canopy samples. *Meiosimyza platycephala* (Lauxaniidae) is also said to be particularly associated with oak and beech woodland though in what way is not clear (Mark Mitchell, 2011).

Fannia are familiar flies, the males forming a mating swarm, usually beneath overhanging tree branches. Female *Fannia* are best collected by sweep netting low down in the field layer. However the *Fannia* collected in the canopy fogging samples were predominantly female rather than males preparing to swarm. The different *Fannia* species also showed a clumped distribution across the trees. Several of the *Fannia* species are recorded as breeding in knot hole detritus as is *Helina abdominalis* (Muscidae) so perhaps the predominance of females was linked with breeding sites.

The best candidate for a canopy specialist previously overlooked at ground level is *Ptolina obscura* (Rhagionidae). This is a Nationally Notable species, previously unrecorded from Wyre, but it was present in all three of the fogged oak trees and in significant

numbers from tree 1. The significant number of specimens from tree 1 suggests a link with dead wood. According to Alexander the larvae develop amongst mosses, but he does mention records from the decaying wood from mossy logs.

Which of the fly species are associated with dead wood?

Keith Alexander has described the special ecological nature of arboreal dead wood as opposed to stacked timber or even fallen branches (Ancient Tree Forum website). It is the denizens of this particular environment which we wish particularly to collect by fogging. The selection of species for Table 2 is based on the English Nature Research Report of Keith Alexander (2002) listing the flies generally connected with dead or rotten wood. However Alexander's report also includes species more distantly connected with arboreal dead wood, such as those species breeding in debris in rot holes, rotting bark on stumps or fallen wood and even species predaceous or parasitic on the more "legitimate" dead wood species.

The Tree 1 sample was particularly striking because of the dominance of the Hybotidae, in particular the numerous dead wood hybotids. These comprised four

Table 2: Species associated with Dead Wood

Family	Species	Tree 1	Tree 2	Tree 3	Total	Notes (Alexander, 2002)
Anisopodidae	<i>Sylvicola cinctus</i>		1		1	Larvae in decaying vegetable matter in knot holes. Slime flux from tree wounds.
Dolichopodidae	<i>Medetera impigra</i>	21			21	Larvae in beetle tunnels in broadleaves and conifers.
Dolichopodidae	<i>Medetera truncorum</i>			2	2	Adults on the bark of broadleaved trees.
Dolichopodidae	<i>Neurigona pallida</i>			1	1	Biology unknown but non-British species of <i>Neurigona</i> bred from rotting wood.
Dolichopodidae	<i>Sciapus platypterus</i>	5	2	185	192	Larvae under bark..
Hybotidae	<i>Euthyneura halidayi</i>	1			1	Has been reared from a knot hole in willow.
Hybotidae	<i>Euthyneura myrtili</i>	2			2	Beech dead wood
Hybotidae	<i>Oedalea apicalis</i>	1			1	Nationally scarce. An ancient woodland species. Probably breeds in dead wood. Reported as hovering over the shattered ends of large fallen trunks.
Hybotidae	<i>Oedalea flavipes</i>	8			8	Oak. Reared in numbers from relatively fresh branchwood.
Hybotidae	<i>Oedalea holmgreni</i>	58		3	61	Probably developing in dead wood.
Hybotidae	<i>Oedalea tibialis</i>	2			2	Larvae in dead wood.
Hybotidae	<i>Tachydromia umbrarum</i>		3		3	Larvae in decaying wood.
Hybotidae	<i>Tachypeza nubilula</i>	1	2		3	Adults on tree bark. Larvae reared from beneath bark in rot holes.
Rhagionidae	<i>Ptiolina obscura</i>	15	1	2	18	Nationally notable. Larvae of <i>Ptiolina</i> spp develop amongst mosses and may occasionally be found in the decaying wood of mossy logs.
Clusiidae	<i>Heteromeringia nigrimana</i>	1			1	Endangered. Larvae probably develop in soft wood decay.
Lauxaniidae	<i>Pseudolyciella pallidiventris</i>	3		3	6	
Lauxaniidae	<i>Pseudolyciella stylata</i>	5		19	24	Often found on tree trunks. Said to be associated with tree sap.
Fanniidae	<i>Fannia lineata</i>	1			1	Insufficient data (RDBK). Reared from rotten debris in a tree and bird nests.
Fanniidae	<i>Fannia polychaeta</i>			59	59	Reared from leaf litter and detritus from a rotten tree trunk.
Fanniidae	<i>Fannia postica</i>		1		1	Reared from a pupa found in a rotten tree stump.
Muscidae	<i>Helina abdominalis</i>	1		2	3	Nationally notable. Larvae in rot holes in old or dead trees.
Sarcophagidae	<i>Macronychia polyodon</i>	1			1	A specialist kleptoparasite ("satellite fly") of sphecoid wasps nesting in dead wood.
Tachinidae	<i>Admontia maculisquama</i>			1	1	Parasitoid of crane fly larvae (<i>Tipula</i> spp) including rotten wood species.

species of *Oedalea* and two species of *Euthyneura*. They are rarely met with at ground level. However all six species however have previously been recorded from Wyre in a Malaise trap set in the Far Orchard of Bowcastle Farm. (Smart and Winnall, 2006). The fruit trees of this orchard have numerous dead branches, either still on the trees or lying on the ground.

The most exciting find from Tree 1 was the clusiid *Heteromeringia nigrimana*. There have been only 7 UK records of this species since 1897 and its status is officially Endangered. The last recorded was from Keith Alexander in 2008; he knocked a specimen from a dead aerial branch of an isolated oak tree in Dunham



Heteromeringia nigrimana male

Mick Blythe

Park, Cheshire. On the other hand Roháček (1995) associates the species with fallen decaying tree trunks.

Admontia maculisquama (Tachinidae) from Tree 3 is a parasitoid of crane fly larvae (Tipulidae), its hosts including, but not restricted to, those which tunnel into dead or rotten wood. The adults of *Admontia* species prefer wet and cold locations. Few details are known of *A. maculisquama* but the related *A. blanda* is reported as laying eggs which are already incubated and ready to hatch. Both the egg and the young larva are sensitive to desiccation and have little mobility and are presumably laid either directly on the host maggot or into the damp conditions of the host's burrow. (Belshaw, 1993)

The rare *Macronychia polyodon* (Sarcophagidae) from Tree 1 is a 'satellite fly', a specialist kleptoparasite of the solitary wasps (Sphecidae) which make nesting tunnels in dead wood. The satellite fly enters the wasp burrow while the female wasp is absent and lays its own egg (or ready-hatched maggot) on the paralyzed prey left there as food for the wasp larva.

The notable Diptera species

The Endangered *Heteromeringia nigrimana* is of course the most notable species recorded in the survey, but *Oedalea apicalis*, one of the dead wood hybotids, is Nationally Scarce.

Table 3: Notable fly species (Diptera)

Family	Species	Tree 1	Tree 2	Tree 3	Total	Status
Clusiidae	<i>Heteromeringia nigrimana</i>	1			1	Endangered
Sarcophagidae	<i>Macronychia polyodon</i>	1			1	Rare (Pre 1994)
Hybotidae	<i>Oedalea apicalis</i>	1			1	Nationally scarce
Rhagionidae	<i>Ptiolina obscura</i>	15	1	2	18	Nationally notable
Lauxaniidae	<i>Aulogastromyia anisodactyla</i>			4	4	Nationally notable
Muscidae	<i>Helina abdominalis</i>	1		2	3	Nationally notable
Limoniidae	<i>Neolimnophila carteri</i>	1			1	Nationally notable
Fanniidae	<i>Fannia lineata</i>	1			1	Insufficient data

Aulogastromyia anisodactyla (Lauxaniidae) has a wide distribution in the UK but has the status of Nationally Notable because within that range it is rare. The Essex Field Club record it from shrubs and from low canopy up to 5 metres. In view of the number found here the canopy might be a good place to find it more regularly especially if the canopy is dense as in Tree 3.

Fannia lineata from tree 1 is probably an under recorded species as it is not included in the widely used Royal Entomological Society identification manual.

Acknowledgements

I would like to thank Saul Herbert for the opportunity to examine the fogging samples, Alan Stubbs and Peter Chandler for confirming the identification of *H. nigrimana* and Peter Chandler for providing details of its previous records and biological information. Adrian Plant has given me much helpful advice and very kindly confirmed the identifications of my dead wood hybotids.

References

- Collin, J. E. (1961). British Flies: Empididae. Cambridge University Press, Cambridge.
- D'Assis Fonseca, E. C. M. (1968). Diptera Cyclorrhapha Calyptrata Section (b) Muscidae. Handbooks for the Identification of British Insects 10(4b). R. ent. Soc. Lond.
- Essex Field Club. www.essexfieldclub.org.uk
- Keith N. A. Alexander (2002) The Invertebrates of living & decaying timber in Britain and Ireland – a provisional annotated checklist. English Nature Research Reports 467.
- Keith N. A. Alexander. Invertebrates and Ancient Trees. Ancient Tree Forum website.
- Mitchell, Mark (June 2011) website now removed
- Roháček, J. 1995. Clusiidae (Diptera) of the Czech and Slovak Republics: Faunistics and notes on biology and behaviour. Casopis Slezského zemského Muzea (A) 44: 123-140.
- Smart, M. J. and Winnall, R. A. (2006) The biodiversity of three traditional orchards within the Wyre Forest SSSI in Worcestershire: a survey by the Wyre Forest Study Group. English Nature Research Reports 707.

Coleoptera by Caroline Uff with weevils by Michelle Putter

67 beetle species from 23 families were identified. Interestingly, the majority (40/67) were classed as saproxylics (Alexander, 2002), i.e. they are associated

with the processes of wood decay or tree damage. Nine species can now be added to the current list of saproxylics of the Wyre Forest, and its ranking in the list of evaluated sites across the UK will increase (NBN, Saproxylic Quality Index website). It is the saproxylic species that are the focus of this report.

The small Rove Beetles were the most abundant group of beetles to be collected and are awaiting full identification. The majority, such as the putative saproxylic *Leptusa fumida*, belong to the sub-family Aleocharinae.

The smaller Soldier Beetles were also numerous, and most were widespread species. However one species worthy of mention is *Malthinus frontalis*, a Nationally Scarce species which had not been previously recorded in the Wyre. There is evidence of a significant recent decline of this species. It appears to be strongly associated with large, old broad-leaved trees and the larvae are thought to develop in well-lit decaying sap/heartwood (Alexander, 2015).

The next most abundant group were arboreal Ground Beetles, with *Dromius quadrimaculatus* being found in particularly large numbers. Adults are known to feed on mites and springtails etc. on the bark of trees (Alexander, 2002). The closely related *D. agilis* and *Calodromius spilotus* were also recorded in good numbers and had not been previously recorded here.

Of the many weevils collected, only two species were considered to be saproxylics including one Nationally Scarce species - *Ernoporicus fagi*. At present, research on the ecology of this species appears to be sparse.

The Minute Tree Fungus Beetles made up a significant proportion of the catch. They are dependent on fungi in dead and dying timber – particularly dead aerial branches of trees. Amongst them was the increasingly common, introduced (but naturalised) species, *Cis bilamellatus* (Alexander, 2002).

The Darkling Beetles were only represented by one species - *Nalassus laevioctostriatus* but this robust species was found in large numbers. The adults are not often

List of Saproxyllic Beetle Species Recorded

Non-saproxyllic species not included

Family	Species	Number
Carabidae	<i>Calodromius spilotus</i> Illiger, 1798	32
Carabidae	<i>Dromius agilis</i> Fabricius, 1797	6
Carabidae	<i>D. quadrimaculatus</i> Linnaeus, 1758	71
Staphylinidae	Aleocharinae -Several species, e.g. <i>Leptusa fumida</i> Erichson, 1839 (unconfirmed)	>100
Pselaphidae	<i>Bibloporus bicolor</i> Denny, 1825	1
Buprestidae	<i>Agrilus (Anambus) laticornis</i> Illiger, 1803	2
Cantharidae	<i>Malthinus flaveolus</i> Herbst, 1786	17
Cantharidae	<i>M. frontalis</i> Marsham, 1802	3
Cantharidae	<i>M. seriepunctatus</i> Kiesenwetter, 1852	87
Cantharidae	<i>Malthodes marginatus</i> Latreille, 1806	18
Cantharidae	<i>M. minimus</i> Linnaeus, 1758	2
Anobiidae	<i>Anobium fulvicorne</i> Sturm, 1837	6
Anobiidae	<i>Hedobia imperialis</i> Linnaeus, 1767	1
Dasytidae	<i>Dasytes aeratus</i> Stephens, 1830	12
Cryptophagidae	<i>Cryptophagus denticulatus</i> ? Heer, 1841	1
Cerylonidae	<i>Cerylon ferrugineum</i> Stephens, 1830	2
Cerylonidae	<i>C. histeroides</i> Fabricius, 1792	2
Latridiidae	<i>Enicmus brevicornis</i> Mannerheim, 1844	1
Latridiidae	<i>E. testaceus</i> Stephens, 1830 (unconfirmed)	2
Ciidae	<i>Cis bilamellatus</i> Wood, 1884	9
Ciidae	<i>C. pygmaeus</i> Marsham, 1802	2
Ciidae	<i>C. vestitus</i> Mellié, 1849	17
Ciidae	<i>Ennearthron cornutum</i> Gyllenhal, 1827	25
Ciidae	<i>Octotemnus glabriculus</i> Gyllenhal, 1827	1
Ciidae	<i>Orthocis alni</i> Gyllenhal, 1813	18
Melandryidae	<i>Abdera biflexuosa</i> Curtis, 1829	17
Melandryidae	<i>A. quadrifasciata</i> Curtis, 1829	4
Melandryidae	<i>Orchesia undulata</i> Kraatz, 1853	3
Tenebrionidae	<i>Nalassus laevioctostriatus</i> Goetze, 1777	46
Salpingidae	<i>Salpingus planirostris</i> Fabricius, 1787	13
Salpingidae	<i>S. ruficollis</i> Linnaeus, 1761	1
Scraptiidae	<i>Anaspis (Anaspis) frontalis</i> Linnaeus, 1758	1
Scraptiidae	<i>A. garneysi</i> Fowler, 1889	1
Scraptiidae	<i>A. lurida</i> Stephens, 1832	1
Scraptiidae	<i>A. maculata</i> Geoffrey in Fourcroy, 1785	17
Scraptiidae	<i>A. regimbarti</i> Schilsky, 1895	2
Cerambycidae	<i>Leiopus nebulosus</i> Linnaeus, 1758	9
Cerambycidae	<i>L. linnei</i> Wallin Nylander & Kvamme, 2009	4
Cerambycidae	<i>Poecilium alni</i> Linnaeus, 1767	4
Cerambycidae	<i>Pogonocherus hispidulus</i> Piller & Mitterpacher, 1783	2
Curculionidae	<i>Ernoporicus fagi</i> Fabricius, 1798	1
Curculionidae	<i>Euophryum confine</i> Broun, 1881	2

seen as they feed at night, grazing on the alga growing on the bark of trees whilst hiding under the bark during the day (Alexander et al., 2014). However, visit the Wyre Forest trees on a warm night and shine a torch on the bark and you are likely to see many (R. Winnall pers com).

Other saproxyllic species were found in lower numbers including some rather beautiful False Darkling Beetles. The Nationally Scarce *Abdera biflexuosa* was recorded in good numbers for the first time here. It is known to develop in aerial dead branches of open-grown trees, especially oak (Alexander et al., 2014).

Longhorn Beetles include the recently separated *Leiopus linnei* and *nebulosa* (Wallin et al., 2009) as well as the nationally scarce *Poecilium alni*. As with recent past records, all four *P. alni* specimens were taken from trees in the Worcestershire section of the forest and it remains apparently unrecorded in Shropshire! (NBN, SEDN).

Many other saproxyllics were also present and are summarised in the table below. It is interesting that 'fogging' targets those species on the surface of the tree, and taxa found in rot holes, under the bark, or

within fungal fruiting bodies may not be represented. Even so, the study further confirms the national importance of the Wyre Forest for saproxilic species.

Although often associated with ancient open grown trees, the species recorded here were supported by younger (c100 yr. old) oaks within a woodland habitat. It is important for many of the species that the trees are allowed to develop good lateral branching and that aerial dead branches and twigs are retained – such as lower dead branches which have been shaded out by the tree's own canopy. Continuity of habitat is also important (K. Alexander pers com).

Around 1/3 of the beetle species caught were relatively widespread species, not considered to be saproxilic and not strongly associated with ancient woodland. Some, like the water beetle *Helophorus (Atractelophorus) brevipalpis* (Bedel, 1881) may have just been very unlucky – caught in the 'fog' whilst passing. Others, such as the Click Beetles *Agriotes pallidulus* (Illiger, 1807) *Athous (Athous) haemorrhoidalis* (Fabricius, 1801) and *Dalopius marginatus* (Linnaeus, 1758), are very widespread in a range of habitats, particularly woodland, and as expected these were recorded in good numbers. The closely related, but less common Throscid beetle, *Trixagus carinifrons* (de Bonvouloir, 1859), was also recorded.

The 109 weevils identified were predominately common species that are widely distributed throughout England and are polyphagous in nature. The canopy that was fogged is primarily dominated by oak (*Quercus* spp.). The majority of the weevils identified from the samples are known to be found on *Quercus* spp. Amongst the weevils identified, *Strophosoma melanogrammum* (Forster, 1771) was the species that dominated the samples, accounting for over 50% of the total number of weevils. This was not unexpected as this species is widely abundant from March, until late in the year, and can be found on *Quercus* saplings (Watford Coleoptera Group). It is interesting to note that this species is almost certainly parthenogenetic (asexual) and to date, males have not been recorded in the UK (Morris, 1997).

There was a surprising absence of other widespread species such as the larger Soldier Beetles (*Cantharis cryptica* being the only one recorded), and ladybirds which were not recorded at all.

Acknowledgements

Thanks to Keith Alexander for verifying the *Ernoporicus fagi* and *Abdera quadrifasciata*.

References

Alexander K.N.A. (2002). The invertebrates of living and decaying

timber in Britain and Ireland, English Nature Research Reports no. 467.

Alexander K.N.A. (2015). NECR134 A review of the beetles of Great Britain. The Soldier Beetles and their allies, Species Status No.16.

Alexander K.N.A., Dodd, S., & Denton, J.S. (2014). NECR148 A review of the beetles of Great Britain. The Darkling Beetles and their allies, Species Status No.18.

Morris, M.G. (1997). Broad-nosed weevils. Coleoptera: Curculionidae (Entiminae). Handbooks for the identification of British insects, vol. 5, part 17a. London: Royal Entomological Society.

Wallin, H., Nylander, U., Kvamme, T. (2009) Two sibling species of *Leiopus* Audinet-Serville, 1835 (Coleoptera: Cerambycidae) from Europe: *L. nebulosus* (Linnaeus, 1758) and *L. linnei* sp. nov. Zootaxa 2010: 31–45

Websites:

The Watford Coleoptera Group <http://www.thewcog.org.uk/>

Saproxilic Quality Index <http://khepri.uk/>

NBN (National Biodiversity Network) <https://data.nbn.org.uk/>

SEDN (Shropshire Ecological Data Network) <http://www.shropshireecology.co.uk/>

Hemiptera and Psocoptera by Keith Fowler

I was excited to be given the opportunity to examine the hemiptera and psocoptera collected during the survey.

When presented with the specimens the number involved came as a bit of a shock. Normally I limit my collecting to what I can cope with in the evening after I return from a site or at most a day's effort on another day. In addition they were, understandably, stored in alcohol; I am used to dealing with dry specimens. So a couple of challenges before starting to identify the insects: ensuring I worked through the specimens in an orderly manner, not missing any, and, finding a method of working with wet specimens with the equipment I had. Neither was difficult to overcome but required a little thought and organisation before plunging in.

In all there were 3222 specimens of which 2643 were hemiptera, 528 were psocoptera and the other 51 were from other orders that had been incorrectly sorted. Not surprisingly given the all-encompassing effect of the technique the vast majority were recovered from the three fogged sites. These results are summarised in Table 1.

I was able to identify 966 of the hemiptera and 391 of the psocoptera to species. The main reasons for the relatively low success rate were: the high number of nymphs, especially hemiptera from the earlier surveys; families I do not attempt to identify, e.g. aphids; females that could not be identified with any confidence to species and specimens that were too damaged.

Hemiptera

33 species of hemiptera were taken in the surveys comprising 2 species of shieldbug, 18 terrestrial heteroptera; 11 auchenorrhyncha (hoppers) and 2 psyllids. Most of these are found on oak, some exclusively, others with a wider range that includes this

Table 1: Summary of the Species by order

Site	Type	Method	Hemiptera	Psocoptera	Others	Total
North of Longdon Wood (SO74867774)	Restored PAWS	Vane	71	9		80
Longdon Wood (SO75307729)	Restored PAWS		15	5		20
Symonds stool coppice (SO76297512)	Limited intervention		10	9	2	21
Total			96	23	2	121
Longdon Wood (SO7536877228)	Restored PAWS	Fogging	1533	200	38	1771
Longdon Wood (SO7514177757)	Restored PAWS		214	42	3	259
Cold Harbour Coppice (SO7618274811)	Limited intervention		800	263	8	1071
Total			2547	505	49	3101
Overall Total			2643	528	51	3222

tree. There were a couple of species that I would not expect on oak, but they do have wings and do fly so they just happened to be in the wrong place at the wrong time.

The majority of the identified specimens came from just three species:

- *Psallus varians* (Herrich-Schäffer, 1841) Miridae - 211 specimens. It is normally found on oak where it feeds on small insects as well as the tree (British Bugs). It was present in all the surveys.
- *Phylus melanocephalus* (Linnaeus, 1767) Miridae - 207. This is also normally found on oak where it feeds on other animals and the plant (Skipper). This was collected at the three fogged trees and one of the sites that was vane trapped.
- *Ribautiana scalaris* (Ribaut, 1931) Cicadellidae - 114. An oak feeder that seems to prefer *Quercus petraea* and is usually found along sun exposed margins, occasionally groups of trees (Nickel). In this survey it was taken from only one of the fogged trees.

Only one of the species found is regarded as something of a rarity. *Psallus albicinctus* (Kirschbaum, 1856) Miridae is classified as Nationally Notable B (JNCC). It prefers sunny locations on oak tending to keep to the crown layer and is therefore caught relatively infrequently (Skipper). This bug was found on two of the three fogging sites; the one where it was not found was the one where only the lower branches were treated.

One species was new to VC 37, Worcestershire:

- *Psallus albicinctus* (Kirschbaum, 1856) Miridae. See above.

Two species were new to VC40, Shropshire:

- *Xylocoridea brevipennis* Reuter, 1876 Anthocoridae. Found on various trees, normally under the bark (Pécart).
- *Psallus mollis* (Mulsant & Rey, 1852) Miridae. Normally found on oak where it feeds on other animals and the tree (Skipper).

Table 2: Hemiptera new to Wyre Forest but not VC37 (Worcestershire) or VC40 (Shropshire)

Family	Species
Anthocoridae	<i>Anthocoris confusus</i> <i>Temnostethus gracilis</i>
Cicadellidae	<i>Alebra albostrigella</i> <i>Eurhadina ribauti</i> <i>Fagocyba cruenta</i> <i>Ribautiana scalaris</i>
Microphysidae	<i>Loricula elegantula</i>
Miridae	<i>Orthotylus tenellus</i> <i>Psallus perrisi</i> <i>Psallus wagneri</i>
Psyllidae	<i>Cacopsylla melanoneura</i> <i>Strophingia ericae</i>

Rosemary Winnall noted that a further 12 of the species were new to the Wyre Forest, as listed in Table 2.

Psocoptera

Although dwarfed in number by the hemiptera a substantial collection of psocoptera was taken in this survey. Specimens from 18 species were identified. Unlike the hemiptera many of which were oak specialists the psocoptera were generalists which are found on a range of trees as well as other vegetation.

The most common species was *Valenzuela flavidus* (Stephens, 1836) Caeciliusidae – 145 specimens. This species is normally associated with the foliage of trees (New). It was found on four of the sites including all three that were fogged.

There were three species that were newcomers to VC40, Shropshire. All were found on fogged trees:

- *Lachesilla pedicularia* (Linnaeus, 1758) Lachesillidae. Found in a variety of habitats such as leaf litter and dry grass (New).
- *Amphigerontia bifasciata* (Latreille, 1799) Psocidae. Normally associated with the bark of a wide variety of trees and shrubs (New).
- *Loensia pearmani* Kimmins, 1941 Psocidae. Found on the bark of various trees (New).

Table 3: Psocoptera new to Wyre Forest but not VC37 (Worcestershire) or VC40 (Shropshire)

Family	Species
Caeciliusidae	<i>Caecilius fuscopterus</i>
	<i>Valenzuela flavidus</i>
Ectopsocidae	<i>Ectopsocus briggsi</i>
	<i>Ectopsocus petersi</i>
Elipsocidae	<i>Elipsocus hyalinus</i>
	<i>Elipsocus pumilis</i>
	<i>Reuterella helvimacula</i>
Mesopsocidae	<i>Mesopsocus immunitis</i>
	<i>Mesopsocus unipunctatus</i>
Psocidae	<i>Loensia fasciata</i>
	<i>Trichadenotecnum sexpunctatum</i>
Stenopsocidae	<i>Stenopsocus immaculatus</i>
Trogiidae	<i>Cerobasis guestfalica</i>

One species was new to VC37, Worcestershire

- *Trichopsocus brincki* Badonnel, 1963 Trichopsocidae. This distinctive species is a recent addition to the British list having been first found in Devon in 2003 (New). It turns up quite regularly in Shropshire. Two specimens were collected from the fogged tree in Cold Harbour Coppice.

Psocoptera are a group that has received little attention in the Wyre Forest and Rosemary Winnall informed me that a further 13 of the 18 species were new to the Forest; these are listed in Table 3.

Note of caution

All the determinations on which this report is based are my own. Subsequent verification by the various National Recorders may lead to some alterations.

References

- British Bugs website: <http://www.britishbugs.org.uk/index.html>
- JNCC, Conservation Designation spreadsheet: Taxon_designations_20161124
- New, T. R., 2005. Psocids Psocoptera (Booklice and barklice) (2nd Edition), Handbooks for the Identification of British Insects Vol.11, Part 7. Royal Entomological Society of London, London.
- Nickel, H., 2003. The Leafhoppers and Planthoppers of Germany (Hemiptera: Auchenorrhyncha): Patterns and strategies in a highly diverse group of phytophagous insects. Pensoft, Sofia.
- Péricart, J., 1972, Hémiptères, Anthocoridae, Cimicidae et Microphysidae de l'Ouest-Paléartique, Faune de l'Europe et du Bassin Méditerranéen 7. Masson et Cie Editeurs, Paris.
- Skipper, L., 2013. Danmarks blomstertæger, Danmarks Dyreliv, Bild 12. Apollo Booksellers, Ollerup.

Thrips (Thysanoptera) by Martin Skirrow

There were 27 thrips in the collection of invertebrates submitted for examination among which 9 species were identified. These proved to be of particular interest in that most belonged to the little studied fungal-feeding family Phlaeothripidae rather than the more familiar flower and leaf-associated species of the families Thripidae and Aeolothripidae. Most of them came from Tree 3.

Phlaeothripidae

Haplothrips subtilissimus (Haliday). Two females and a second-instar larva. The species is found on oak branches and is widespread in Europe and locally common in Britain.

Hoplothrips fungi (Zetterstedt). 11 specimens, at least two of them females. According to Kirk (1996) the species is found in dense stands of young oak when lower branches are dead from shading. They are found under *Peniophora* fungus.

Hoplothrips corticis (De Geer). Two females. This species is also associated with dead wood of Angiosperms. Less common in Britain than *H. fungi*.

Hoplothrips pedicularius (Haliday). A macropterous female. This species feeds on *Stereum* spp. on dead wood of many kinds of deciduous trees.

Hoplothrips semicaecus (Uzel). Two females. The species is associated with the dead wood of angiosperms. In Britain it is found mainly in south-eastern counties.



Hoplothrips semicaecus female, 3.2 mm. Martin Skirrow

Phlaeothrips coriaceus (Haliday). Two males. The species is found on dead branches. Widespread in Europe but infrequently found in Britain.

Thripidae

The non-fungal-feeding species *Limothrips cerealium* (Haliday), *Taeniothrips picipes* (Zetterstedt) and *Thrips minutissimus* (Linnaeus). *T. minutissimus* is associated with oak flowers, but the other two were probably casual visitors.

I know of no other reports of thrips found by canopy fogging, so these results are of particular interest. Fungus-feeding thrips are little studied and certainly under-recorded.

Acknowledgements

I am indebted to Dom Collins (York) for examination of the thrips and for helpful comments.

References

Kirk, W.D.J., 1996. Thrips. New Naturalists' Handbooks 25. Richmond Publishing Co. Ltd. Slough, 70pp.

Other Invertebrates

John Partridge identified 1 pseudoscorpion *Chthonius ischnocheles*, 3 harvestmen species *Mitopus morio*, *Platybunus triangularis* and *Leiobunum rotundum* and 18 spider species. 3 of these spiders were new to our Wyre list: *Maso sundevalli*, *Micrargus subaequalis* and *Tetragnatha obtusa*. Only *Neriere peltata* and *Paidiscura pallens* occurred from all 3 fogged trees. *Lepthyphantes tenuis* appeared in one of the vane traps but not the fogged trees. There were a large number of immature spiders, mainly orb spider, which were not identifiable, also many mites which John does not identify.

Gary Farmer recorded 5 species of Green Lacewings: *Dichochrysa ventralis*, *Dichochrysa prasina*, *Chrysopidia ciliata*, *Chrysoperla carnea* agg., *Cunctochrysa albolineata*, and 3 Brown Lacewings: *Hemerobius micans*, *Hemerobius lutesens* and *Symphorobius klapaleki* (the latter determined by Colin Plant). The Waxfly *Coniopteryx tineiformis* and Scorpionflies *Panorpa germanica* and *Panorpa communis* were present. Nymphs of Common Earwigs *Forficula auricularia*, and immature Oak Bush Crickets *Meconema thalassinum* were recorded and there were several Common Rough Woodlice *Porcellio scaber*. Only one millipede was present amongst the samples, but this was damaged so could not be identified. One stonefly *Nemoura cinerea* and 3 adult caddisflies *Limnephilus affinis* were recorded from Cold Harbour Coppice where the fogging took place above Unclys Reservoir and stream. From the same tree one Land Caddis larva *Enoicyla pusilla* was surprisingly amongst the fogged material.

Geoff Trevis checked the Hymenoptera. As expected the fogging samples contained hundreds of Wood Ant *Formica rufa* workers. In addition *Formica fusca* and *Myrmica ruginodis* ants were identified. No bees were reported from the fogging, but the Vane traps resulted in a few bees: four Honey bees *Apis mellifera*, two male *Bombus lapidarius* and two *Bombus terrestris/lucorum* bumblebee workers. Hundreds of *Parasitica* were not identified.

Pete Boardman identified the following Springtails: *Entomobrya nivalis*, *E. albocincta*, *E. multifasciata*, *E. intermedia*, *Orchesella cincta*, *Allacma fusca*, *Pogonognathellus longicornis*, *Lepidocyrtus lanuginosus*, all from the fogging.

Concluding remarks

Naturalists have been visiting the Wyre Forest for centuries, and many wildlife records have been documented over this time. But the largest of all the habitats has been impossible to survey until recently; the tree canopy makes up so much of the forest and yet we have very little understanding of what lives there and how this ecosystem works. This fogging project has gone a little way in providing more information about some of the invertebrates using this habitat.

Although just three trees were fogged (and only two successfully), so much was learned - about how to undertake this procedure, about the conditions necessary for collection of invertebrates without too much damage of specimens, and, of course, about which species were present at that time.

This involved collaboration between Natural England, the Wyre Forest Study Group and associates. The sorting and identification of so much material was a daunting task and many thanks to all who generously gave up their time to complete the task. We thank Natural England for involving us in this groundbreaking project in the Wyre Forest. It would be interesting if we could fog a few conifer trees next to compare results!



Mick Blythe examining fogged tree 3 in winter R. Winnall