Wyre Forest Study Group

Entomology Day 2018

Flights of Fancy

CHAIR: BRETT WESTWOOD, REPORT: SUSAN LIMBREY

Speakers from left: Wendy Carter, Steven Falk, Richard Comont, Brett Westwood, Malcolm Smart, Erica McAlister, Gary Farmer
Steve Horton

Chaired by **Brett Westwood**, our title gave speakers scope to cover a range of topics, out of which a recurring theme of concern about pollinating insects became apparent.

Steven Falk, in **Breaking Down Barriers to Invertebrate Identification,** told us that throughout his career he has been committed to making entomology accessible no matter what level of expertise people may have. He started as an artist, and he showed us some of his childhood, but far from childish, pictures of birds. He was as fascinated by the literature and by the artists and their techniques, as by the natural history, citing Roger Tory Peterson, the father of modern user-friendly field guides, the draughtsmanship of Charles Tunnicliffe using watercolours, and Basil Ede, using gouache, among others. By the age of thirteen, Steven had focussed on insects, especially hoverflies and bumblebees, his skills progressing from his early use of coloured pencils and felt-tips to poster paint, discovering the Rötring pen, and then learning to use gouache, his knowledge and technique advancing together.

When he was 15, Alan Stubbs asked him to do the illustrations for British Hoverflies. Published by BENHS in 1983, this book, with its simple keys, big genera divided into smaller keys and short snappy text with an ecological flavour, made recording much easier, broke down barriers, and influenced Steven's own later work. He spent his second undergraduate year doing 13 diptera plates for Michael Chinery's Collins Guide to the Insects of Britain and Northern Europe (1986), one of five artists illustrating 2000 species, another groundbreaking book. Steven showed us how his technique progressed through the book, for example with lateral lighting giving a three dimensional effect.

In 1985, work began on illustrations for George Else's Handbook to British Bees. Pen and ink, using combinations of stippling and cross-hatching, produced an amazing array of tones and textures, and Steven acknowledged the influence of the work of Amadeo Terzi and Arthur Smith of the Natural History Museum in developing these techniques. The two-volume Handbook of the Bees of the British Isles by Else and Edwards did not appear until 2018, but in the meantime Steven realised that a user-friendly book was needed, and he worked on the Field Guide to the Bees of Britain and Ireland (2015), for which Richard Lewington did the illustrations. He admits that the book is not really handy to

Some illustrations for British Hoverflies Steven Falk

Some illustrations for Chinery's Collins Guide Steven Falk

use in the field, but it fulfils his aim of accessibility, with dichotomous keys broken down into bite-sized chunks, punchy species accounts, using common names which reinforce identification, and he emphasised the importance of good book design.

Steven had already started covering key pollinators on his Flickr site, Steven Falk Flickr Collections, in 2011 and he decided to complement the bee book with more pictures and information on habitats, parasites, hosts etc., and with hyperlinks to national databases and research papers. This has now become his focus in making resources for insect identification affordable, accessible, accurate but not too complicated or technical, visually attractive and exciting: "for the experts of the future before they are experts". He showed us how it serves as 'a virtual museum collection', with details in micro-photos and a zoom facility. He uses a TG4 camera in microscope mode, with stacking, and can handhold the camera down the microscope. The site can be used on a smart phone like an app. It is constantly up-dated, and grows as he adds more insect orders. Steven explained that he is registered with Flickr Pro for a small annual payment. This allows an unlimited number of photos to be uploaded and has no adverts. He has designed his Flickr site to be viewed in Collections View so that it can be organised hierarchically based on taxonomy, like a giant encyclopedia.

Finding the Ultimate Fly took **Brett Westwood,** with **Wendy Carter** and **Steve Bloomfield,** on a jaunt to the Highlands of Scotland. Wendy, egged on by Brett, told us how, during their sojourn in the heathery surroundings of Boat of Garten and flowery banks of the River Spey, somewhat competitive insect hunting resulted first in finding the wasp *Ancistrocerus scotica* nectaring on heather right by the lodge, then the Blood Red Longhorn Beetle *Anastragalia sanguinolenta*. At a series of pools near Loch Garten, the Northern Damsel Fly *Coenagrion hastulatum* appeared, and feeding on a melancholy thistle (it was Scotland, after all) beside the Spey, there was the Northern Rose Chafer, *Protaetia metallica*.

Blood Red Longhorn, *Anastragalia sanguinolenta* Wendy Carter

Bumbleebee Robberfly *Laphria flava* Wendy Carter

However, after this suite of rarities, all except the wasp found only in that part of Scotland, Brett's bucket-list fly was not so easily tracked down. Having searched in the pine forest, its only habitat, they eventually came upon a clearing with a scruffy old timber yard and left-over pine logs, and there it was, the rare Bumblebee Robberfly *Laphria flava*, feeding on a longhorn beetle, and obligingly posing for Wendy's superb photographs.

'Why Flies?', asked **Erica McAlister**, who looks after 3 million specimens of them in the Natural History Museum and is determined to make us like them, or at least to share her enthusiasm and appreciate the importance of their often repulsive habits. In conversation with Brett Westwood, Erica told us how flies, far from just hanging around on faeces, spreading disease and biting us, have, over 225 million years, adapted to so many niches in so many habitats to become perhaps the most ecologically evolved of all insect orders. They are critically important to people, being the bin men of the world, recyclers, composters and disposers of waste, and are essential pollinators.

Erica acquired her interest in flies very early, as a child who kept animal carcases under her bed to watch what happened. She told us she now sits in her garden watching flies and thinking 'I know what you're up to', and she introduced us to extraordinary creatures with astonishing life histories. Blood worms, larvae of *Chironomus plumosus*, decomposers in anoxic environments, store oxygen in their proteins and can live up to 13 years, waiting for the right conditions, whereas an adult life of only 3 hours awaits the tiny flightless marine midge of the poorly known *Pontomyia* genus. The mosquito *Culex pipiens* has developed a form, *molestus*, which molests people with vicious bites in the London Underground and other subterraneous locations. Black Soldier Flies, *Hermetia illucens*, are being factory farmed on chicken manure for their pupae to be fed to the chickens, and some are being produced more directly for human food.

Members of more than 70 families of flies are pollina-


A Biting Midge that pollinates cacao flowers Erica McAlister

tors. Top pollinators include the hover fly *Volucella bombylans*, buzz-pollinating at times and in places too cold for honeybees. Biting midges of the genus *Forcipomyia* are pollinators of the cacao tree. They need forest to breed in, but clearing forest to plant more cacao is putting our supplies of chocolate at risk. In Peru, Erica has collected at high altitude for the study of temperature profiles and horizontal ranges of the pollinators of potatoes and the other Solonaceae that originated there. The endearing-looking Bee Fly, an ectoparasite, wraps its eggs in mud and flings them close to the nest or larvae of its host. Some of the pollinating flies have very specialised relationships with plants. The distinctive flora of the Cape region of South Africa includes a lot of tube flowers that need pollinators with equally long proboscises, an extreme case being *Moegistrorhynchus longirostris* a fly with a proboscis eight times as long as its body (and a name to match).


Moegistrorhynchus longirostris Erica McAlister

To illustrate the usefulness of flies to people, Erica told us about predatory species used to control pests. For example, hoverfly larvae that eat aphids can home in on the aphids' alarm signal, undermining their defence, and predatory mosquito larvae, whose adult males and females are vegetarian, are used to control other mosquito species. Fly venoms, all different from different genera, and ten of them new to science from robber flies alone, are being studied for potential in medicinal use. Larval stages are only known for some 40% of fly species, and DNA studies of pupae are being used to link to adults, and of gut contents to find out what they are feeding on. In forensic science, pupae can be used to determine time of nasty events to the hour.

Erica went on to talk about some of the flies that are parasites and parasitoids. Extraordinary-looking Bat Flies consist mostly of body and legs with long claws to hang on with, having no wings and a minute head. Weirder still are the Bee Riders, looking more like mites, eating pollen stores and detritus and spreading among bee colonies by hitching lifts. Extreme versions of the parasitoid lifestyle are that of the spider-killing flies that consume their host from within and can go into stasis so as to synchronise their emergence with the maturity of the spider, and the Phorid flies that decapitate ants, their larva crawling up inside the body into the head, eating its contents and then releasing an enzyme that makes the head fall off. These are now being reared and released to control fire-ants, a nasty pest in the US.

Erica concluded by saying that most flies are beautiful and many are beneficial, and she certainly convinced us of the fascination of their extraordinary diversity, morphologies, habitats and life styles. She reminded us that 2019 has been declared The Year of The Fly.

In **Monitoring the Plight of the Bumblebees, Richard Comont,** of the Bumblebee Conservation Trust, talked about the importance of the 25 species of bumblebees among the 270-280 pollinating species in Britain. He explained their evolutionary history, developing fur as adaptation to cold in the Himalayas and so being able to spread only north to avoid over-heating. They are warm-blooded, generating heat by buzzing their fight muscles without flapping their wings, the thorax being mostly muscle. They are messy eaters, shedding pollen, whereas honeybees are better at carrying it home, and they work early and late, avoiding high temperatures in the middle of the day. They need dry places for hibernation, facing north so as not to emerge before resources are available.

Their plight is exemplified by declines in range and by extinctions, two species, Cullum's Bumblebee *Bombus cullumanus* and the Short-haired Bumblebee, *B. subterraneus*, having become extinct in Britain, and eight are endangered. Re-introduction has seen the Short-haired Bumblebee nesting on Dungeness, but it is not yet an established population. Of the endangered species, the Great Yellow Bumblebee, *B. distinguendus* is now confined to the machairs of the very north of Scot-

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Tree Bumblebee *Bombus hypnorum* Richard Comont

land and the Western Isles and Orkney.

Distribution records are well established, so we know where the bumblebees are, but we need to know how many there are to detect declines and get early warning of losses. This is where the national BeeWalk scheme (www.beewalk.org.uk) comes in. Started in 2010, there are now 449 sites submitting data and so far over two hundred thousand individual bees have been recorded. Participants walk a 1-2 km transect monthly from March to October, counting and identifying bumblebees.

Richard presented some of the results, which are published in Annual Reports. Blobbomaps for *B. pratorum* and for all species, giving both distribution and abundance, showed clear differences between cold 2013 and warm 2014. Tabulation of population trends showed that numbers of some species, including some of conservation concern, are rising, but more are falling and the general story is of decline.

Discussing the causes of decline, Richard showed diagrams of insecticide use. Though use is increasingly controlled, and total weight of the active ingredients is falling, the area sprayed is rising, and frequency of application has increased greatly. There is also concern about sub-lethal effects. Other changes in agricultural practice include the 98% loss since the 1940s of flower-rich grassland, now reduced to small isolated patches, slashing of field boundaries and removal of hedgerows, multiple grass cuts and heavy grazing, and grassland fertilisation.

Richard finished by re-iterating the vital importance of pollinators for our food supplies, saying that we can't hope to replace them with drones, or with people wielding paintbrushes.

According to **Malcolm Smart,** introducing his review of **Britain's Robberflies,** these are the big cats of the insect world: carnivorous as adults, and probably also as larvae. Robberflies have eyes separated by a deep notch at the top of the head and have the mystax, a central clump of down-curved bristles on the face above the upper mouth edge. 29 of the world's 7000 or so species have been recorded in Britain but two are now extinct; Worcestershire has 13 known species (marked*).

Starting with the largest, the Hornet Robberfly, *Asilus crabroniformis**, whose eggs are laid on or near dry mammal dung, Malcolm showed us all the British species, highlighting their identifying characteristics and talking about their habitats and distribution.

Among the less common species is the unmistakeable *Pamponerus germanicus*, with a white area at the base of the wings, living mainly on west coast sand dunes. *Philonicus albiceps* is also found only in coastal sand dunes. The female has spines surrounding the tip of the ovipositor, perhaps used in digging holes for the eggs. *Eutolmus rufibarbis*, which has a golden mystax in the male, is limited to southern sandy heaths, including Suffolk. Another species which likes sandy places is *Dysmachus trigonus**.

The six *Dioctria* species(*x5) are very similar, and Malcolm showed us the differences in the colour of their legs and wings. The two long slender *Leptogaster* species are conspicuous in lacking pads on the feet. *L. cylindrical** is common in the southern half of England, the rarer *L. guttiventris** extending much further north.

Malcolm showed us the distinguishing features of three small but very similar *Machimus* species: the very rare *M. cowini* (described from the Isle of Man) which was recently recorded for the first time on the Cumbrian coast, *M. atricapillus**, the commonest of our Robberflies, though only found in the southern half of the country and the less frequent but more northerly *M. cingulatus**. The larger *M. arthriticus*, which needs disturbed soils, only occurs within a 34km radius around

Robberfly *Machimus atricapillus* with horsefly *Haematopota pluvialis* Rosemary Winnall

Thetford, while *M. rusticus* is found only in southern limestone grasslands.

Females of the genus *Neoitamus* have the last two abdominal segments incorporated into the ovipositor. The common *N. cyanurus** is typically found in woodland margins and the very rare *N. cothurnatus*, with only four records in mainland Britain, in the Oxford area, occurs more frequently in the Channel Islands.

The genus *Neomochtherus* has many species in Europe, but was not known in Britain until a single specimen of *N. pallipes* was discovered in 1980 on the South Devon coast. That could have been a blow-in, but in 2016 Nigel Jones found a colony near Shrewsbury.

Of the two *Leptarthrus* species, the more localised *L. vitripennis*, first found in Surrey in 1996, is now being found more widely; *L. brevirostris,* notable for its very long hind metatarsus, is very widespread as far as the north of Scotland.

The small *Lasiopogon cinctus** is the only Robberfly active in the Spring, when it is widespread in England South of Cumbria, especially in sandy areas. The rather similar *Rhadiurgus variabilis* is characterised by a shiny black square below the antennae and is one of only two Robberfly species limited in Britain to Northern Scotland, the other being the yellow-haired *Laphria flava. Choerades marginatus**, closely related to *L. flava*, but smaller and black with inconspicuous pale hair, is widely distributed in southern England.

Malcolm finished by talking about the distribution of *Machimus cowini*. It occurs on Dutch and German North Sea islands, in the Rhine Delta, up the Rhine to the German border, and possibly on towards the source of the Rhine and the nearby source of the Danube. It has been recorded in Hungary near the Danube, in Croatia on a tributary of the Danube, and in several places in Romania down to the Danube delta. Migration as the last ice age retreated can be postulated, from the Black Sea along the Danube/Rhine corridor, across the North Sea to Britain.

'That's amazing', says **Gary Farmer** when people tell him what they've found and as he meets yet more creatures with extraordinary habits, and he told us that **The Amazing Never Ends.** He took Erica's book with him to Greece as holiday reading, and having seen the little moth fly *Clogmia albipunctata*, amazement turned to alarm on reading of its habit of laying eggs in people's nether regions, its larvae crawling up the urethra.

Turning to exotic crickets, Gary talked about *Gryllodes supplicans,* the tropical house cricket, which he buys in to feed his daughter's gecko. They do not survive when they escape in his house, possibly being eaten by spiders, but several sang in his garden for three months in the summer of 2018. They are bred in warehouses near Cambridge for sale as food for reptiles and amphibians, and the 'cricket snatcher' spider *Thanatus vulgaris* has found its way into these warehouses. Gary was amazed to find one in a van in a cider orchard near Pershore, on a crate which had been used by a cricket farmer, it's amazing the ways some things move across the country. Local cricket records now include Roesel's Bush-cricket, *Metrioptera roeselii* which has moved up from Oxfordshire without the help of a van and is now found throughout Worcestershire, aided by its ability to produce long-winged forms in hot weather helping it to fly in, as is also the case of the Long-winged Conehead, *Conocephalus discolor.* Two individuals bred through by Gary under a heat lamp grew extra-long wings and were capable of vertical take-off, disappearing over the roof of his house!

Gary has great enthusiasm for bugs, and he showed us some new arrivals in the County: the Bishop's Mitre Shieldbug, *Aelia acuminata* now throughout, Box Bug, *Gonocerus acuteangulatus,* spreading and found this year on buckthorn along the Avon valley. A Hawthorn Shieldbug, *Acanthosoma haemorrhoidale,* which stinks, amazed Gary when he dropped it and it flashed its black and red alarm signal.

Many insects use these amazing colour patterns to put off predators but many more use camouflage for staying alive: bugs with blotches and bumps to mimic plant patterns or debris, moths that can become invisible by merging with their background, plant hoppers hiding in their own frothy flatulence, land caddis larvae covered with bits from their substrate, lacewing larvae covered in the skins of recent meals, and even tortoise beetle larvae covered with their own excreta.

Gary moved on to the orchards he looks after, talking about pollination and the aspects of the orchard habitat that pollinators need. Bee flies just touch the flowers with their legs as they sup; conopids are important pollinators, and bumblebees use old mossy stumps for nesting. The hoverfly *Myathropa florea* and others need wet rot holes where their rat-tailed maggot larvae live. Fungus gnats need rotting vegetation, compost, decaying wood and fungi etc. A recent arrival in the orchards, Lesnes Earwig, *Forficula lesnei,* appears to be following the river corridors right up through the county (with a concentration of records in the Avon valley perhaps mapping Gary's stamping ground). Dead and dying trees in the orchards provide the habitat for both species of Cardinal beetle, the Malachite beetle

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and Longhorn beetles. The flowering plants beneath the trees and along the hedgerows provide food for a lot of weevil species. *Ixapion variegatum*, a weevil using mistletoe, is found here; it was new to Britain on August 11th 2000, and on ponds there is the duckweed weevil *Tanysphyrus lemnae* and the Azolla weevil *Stenopelmus rufinasus*. Gary and his wife Nicki have been hunting the Figwort Weevil, *Cionus scrophulariae*, to map its movement up through the County. Its larvae are far from attractive, looking like slimy caterpillars, but the adults are cute little critters that can hide amongst the damaged seed pods and if needed can even mimic caterpillar frass.

New to Britain in 2008 was the chalcid wasp *Brachymeria tibialis*, a parasitoid and this was found in the Lenches in 2018. Finding pupa cases in dead wood which looked like the work of a species of *Ectemnius*

Duckweed Weevil *Tanysphyrus lemnae* Gary Farmer

Brachymeria tibialis Gary Farmer

wasp, and finding an adult which he got confirmed as *E. cephalotes*, Gary then found the rare fly *Macronychia griseola*, a kleptoparasitoid of sphecoid wasps, a first for Worcestershire.

For our last amazement, Gary took us back to his holiday in Greece to show us the nymph of a Mantis, *Empusa* sp. poised on his knuckles, looking like a delicate wire sculpture.

To conclude Brett thanked everyone who had made Entomology Day so successful: the Wyre Forest Study-Group committee, the members who had helped make cakes and serve refreshments, to Rachel Poloni and Phil Linnell who provided the sound system, and especially to the excellent speakers who gave such stimulating talks and all who attended. We look forward to the next event in 2019!

Worcestershire Entomology Day 2018, Rock Village Hall Steve Horton