INSECTS FROM AN EMERGENCE TRAP OVER A SMALL, DEAD OAK TRUNK

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ABSTRACT

The invertebrates emerging from a standing trunk of a dead oak tree in Sedlescombe, East Sussex during 2000–2001 are reported. Eighty-six species from eight Orders were noted, the majority (77%) of which were Diptera. Notable species included *Nemapogon ruricolella* Stainton, *Dolichopus arbustorum* Stannius and *Fannia speciosa* (Villeneuve).

INTRODUCTION

On 10 October 2000 I installed a long sleeve of fine mesh black netting over a small 'chandelle', a standing dead trunk, of oak, *Quercus robur* L., about 1.5 metres tall and 20 cm in diameter in a shady, woodland part of our garden in Sedlescombe, East Sussex (map ref.: TQ783188) with the aim of trapping emerging invertebrates.

The chandelle had, for some years, been part of a hedge, but had died naturally and was heavily decayed, with bark remaining on the east side and bare wood on the west. The common moss *Amblystegium serpens* (Hedw.) covered the base for a few centimetres above the ground and various fungi had colonised the wood.

The sleeve was long enough to reach the ground and entry from the outside was possible, but difficult. The top of the sleeve simply rested on the top of the chandelle. The trap was carefully removed as often as possible, usually daily, to extract with a pooter any insects that had gathered inside.

A few insects were found in the trap during the autumn and winter, but the main emergence did not start until the end of March 2001 and then continued steadily through the summer and autumn until the project was stopped on 10 October 2001, a year after it had started.

The number of species and individuals living in, or on, such a small log was surprisingly large, especially as many of the non-flying, or rarely-flying, invertebrates would not have been recorded. The number of Coleoptera was, however, small and some members of this order may have made their way out through the bottom of the trap, or simply fallen unnoticed to the ground when the sleeve was removed.

Some of the species recorded appeared in numbers or over a long period of time, others especially the larger kinds, were recorded as only one, or very few, individuals. This raises the question of whether females of these larger species laid only few eggs on this small piece of wood, or whether competition or predation reduced an originally larger number of individuals.

Many of the insects recorded are known to breed in dead wood or its associated fungi, or to be predaceous on other species in these situations. Some though were probably simply taking shelter under the bark, while others may have been passing one or another of their stages at the base of the chandelle where it was damper and graded into the soil. A few, such as the earwig, *Forficula auricularia* L., or the cricket *Meconema thalassinum* (De Geer), seem to be able to find their way into many kinds of trap. Because the trap was put in situ in October, the chandelle no doubt contained many non-saproxylic species that were already using the habitat to overwinter.

Table 1. Species emerging from a standing, dead oak tree-trunk, Sedlescombe, East Sussex, 2000–2001.

Collembola
- Entomobryidae
  - *Entomobrya ?corticalis* (Nicolet)
  - *Entomobrya nivalis* (L.)
- Sminthuridae
  - *Sminthurus viridis* (L.)

Orthoptera
- Tettigoniidae
  - *Meconema thalassinum* (De Geer)

Dermaptera
- Forficulidae
  - *Forficula auricularia L.*

Psocoptera
- Caeciliidae
  - *Caecilius flavidus* (Stephens)
- Stenopsocidae
  - *Graphopsocus cruciatus* (L.)
- Lachesillidae
  - *Lachesilla pedicularia* (L.)
- Psocidae
  - *Trichadenotecnum sexpunctatum* (L.)

Hemiptera
- Lygaeidae
  - *Kleidocerys resedae* (Panzer)
- Cimicidae
  - *Anthocoris nemorum* (L.)
- Cercopidae
  - *Philaenus spumarius* (L.)
- Cixiidae
  - *Cixius nervosus* (L.)
- Issidae
  - *Issus coleoptratus* (Fabricius)

Coleoptera
- Staphylinidae
  - *Dromius linearis* (Olivier)
- Nitidulidae
  - *Meligethes* sp.
- Lathridiidae
  - *Aridius bifasciatus* (Reitter)*
- Curculionidae
  - *Sitona* sp.

Lepidoptera
- Tineidae
  - *Nemapogon cloacella* Haworth*
  - *Nemapogon ruricolella* Stainton*

Diptera
- Trichoceridae
  - *Trichocera annulata* Meigen*
- Tipulidae
  - *Tipula staegeri* Nielsen
  - *Tipula flavolineata* Meigen*
  - *Tipula scripta* Meigen*
- Limoniidae
  - *Limonia nubeculosa* Meigen*
  - *Neolimonia dumetorum* (Meigen)*
  - *Austrolimnophila ochracea* (Meigen)*
  - *Ormosia nodulosa* (Macquart)
  - *Rhypholophus varius* (Meigen)
- Psychodidae
  - *Psychoda* sp.
  - *Psychoda grisescens* Tonnoir
- Ceratopogonidae
  - *Atrichopogon lucorum* (Meigen)
  - *Dasyhelea versicolor* (Winnertz)*
- Chironomidae
  - *Bryophaenocladius ?furcatus* (Kieffer in Thienemann & Kieffer)
  - *Gymnometriocnemus brumalis* (Edwards)
  - *Limnophyes minimus* (Meigen)
  - *Metriocnemus albolineatus* (Meigen)
- Anisopodidae
  - *Sylvicola punctatus* (Fabricius)*
- Keroplatidae
  - *Orfelia fasciata* (Meigen)*
- Mycetophilidae
  - *Mycomya ?cinerascens* (Macquart)*
  - *Acnemia nitidicollis* (Meigen)*
  - *Synapha vitripennis* (Meigen)*
  - *Anatella* sp.
  - *Anatella ?ciliata* Winnertz*
  - *Rymosia virens* Dziedzicki
  - *Exechia* (*parvula* complex)*
  - *? Exechiopsis leptura* (Meigen)
  - *Dynatosoma fuscicornis* (Meigen)*
- Sciaridae
  - *Trichosia pilosa* (Staeger)*
  - *Trichosia viatica* (Winnertz)
  - *Lycoriella inflata* (Winnertz)
  - *Bradysia* sp. *incert.*
  - *Bradysia nitidicollis* (Meigen)
  - *Scatopsciara pusilla* (Meigen)*
- Cecidomyiidae
  - *Campylomyza flavipes* Meigen*
- Hybotidae
  - *Tachypeza nubila* (Meigen)*
  - *Platypalpus ciliaris* (Fallén)
  - *Platypalpus luteus* (Meigen)
  - *Oedalea flavipes* Zetterstedt*
  - *Oedalea tibialis* Macquart*
  - *Euthyneura halidayi* Collin*
- Dolichopodidae
  - *Dolichopus arbustorum* Stannius
  - *Dolichopus trivialis* Haliday
  - *Medetera impigra* Collin*

continued

Table 1. (*continued*)

Diptera (*continued*)
- *Syntormon tarsatus* (Fallén)
- *Sciapus platypterus* (Fabricius)*

Lonchopteridae
- *Lonchoptera lutea* Panzer

Phoridae
- *Megaselia* spp.
- *Anevrina thoracica* (Meigen)*
- *Borophaga incrassata* (Meigen)
- *Diplonevra concinna* (Meigen)
- *Diplonevra pilosella* Schmitz
- *Spiniphora dorsalis* (Becker)

Platypezidae
- *Paraplatypeza atra* (Meigen)*

Syrphidae
- *Myathropa florea* (L.)*
- *Criorhina berberina* (Fabricius)*
- *Xylota sylvarum* (L.)*

Lauxaniidae
- *Peplomyza litura* (Meigen)*

Heleomyzidae
- *Heteromyza rotundicornis* (Zetterstedt)

Sciomyzidae
- *Pherbellia ventralis* (Fallén)

Sphaeroceridae
- *Spelobia nana* (Rondani)
- *Spelobia* (*palmata* group) sp.

Clusiidae
- *Clusia flava* (Meigen)*

Tachinidae
- *Phytomyptera cingulata* (Robineau-Desvoidy)*

Fanniidae
- *Fannia speciosa* (Villeneuve)

Muscidae
- *Phaonia palpata* (Stein)*

*Species specifically associated with dead wood, or dead wood fungi.

Results

The following list includes only species that I have managed to identify (Table 1). There were, in addition, many Hymenoptera Parasitica which I have not, so far, attempted to determine.

Notes on some individual species

Nemapogon ruricolella Stainton (Lep: Tineidae). On 3 June about six males of this fungus-feeding 'Notable' species were on the outside top of the trap at about 7pm. They were running about over the flat surface of the material with their wings spread out and vibrating rapidly. Females had emerged within the trap and this was clearly the cause of this assembling behaviour. Their identity was confirmed by dissection of the genitalia.

Tipula staegeri Nielsen (Dipt: Tipulidae). A species normally associated with mossy stream sides (Stubbs, 1992) but breeding, perhaps, in the damp moss at the base of the chandelle.

Platypalpus ciliaris (Fallén) and ***P. luteus*** (Meigen) (Dipt: Hybotidae). Both these species occurred in low numbers over several weeks and were undoubtedly breeding in the chandelle. Their breeding site does not previously seem to have been recorded.

Dolichopus arbustorum Stannius (Dipt: Dolichopodidae). A 'Notable' species described in *Recorder* 3.3 as 'very scarce'. It is not infrequently found in association with decaying wood in our garden.

Borophaga incrassata (Meigen) (Dipt: Phoridae) has been recorded as a parasitoid of *Bibio marci* (L.) (Dipt: Bibionidae). Some bibionids are associated with rotten wood (Hövemeyer, 1998) and the fly may have been parasitising one of these. Alternatively it could have been in another of the larger dipterous larvae.

Phytomyptera cingulata (Robineau-Desvoidy) (Dipt: Tachinidae) has been recorded as a parasitoid of *Nemapogon* spp. (Lep: Tineidae) and members of this genus were probably its host in the chandelle.

Fannia speciosa (Villeneuve) (Dipt: Fanniidae). A 'Notable' species that seems to be primarily associated with woodland (Séguy, 1926) and which has been reared from leaf litter (Smith, 1989).

Conclusions

The invertebrates associated with dead wood can be divided into many categories and relatively few are obligatory, primary dead wood feeders. Kirby & Buckley (1994) divided captures from their dead wood emergence experiments into six groups:

Saproxylic species.
Fungus-breeding species not specific to saproxylic situations.
Species using deadwood as a pupation site only.
Species using deadwood for winter hibernation purposes only.
Species more or less ubiquitous in habits.
Species associated with epiphytes.

One might add to this:

Species that 'graze' on moulds and other microscopic plants growing on, or within, dead wood.
Species that are attracted to dead wood exudates or saproxylic fungi, but do not necessarily breed in them or in the wood.
Species that breed in very rotten wet wood as well as soil and similar situations.

There are also many insect predators or parasitoids that may be found in association with rotten wood but could equally be present in other habitats. The tachinid fly, *P. cingulata*, for example, is often a parasitoid of lepidopterous larvae that live in dead wood, but it has also been bred from moth larvae feeding on higher plants, lichens and fungi (Belshaw, 1993).

Most dead wood emergence trap experiments also record invertebrates whose presence is not easy to explain. While some of these are undoubtedly casuals that happened to get into the trap by some unknown means, others have been recorded with sufficient regularity to indicate that dead wood (or emergence traps) have some particular attraction for them. Common earwigs, *F. auricularia* and oak crickets, *M. thalassinum*, are examples and mentioned above. Various insects associated with open grassland also turn up quite often in dead wood traps: adults of the cuckoo spit insect, *Philaenus spumarius* (L.), for example. The beetle bug *Issus coleoptratus* (Fabr.) is also of frequent occurrence, both as adults and nymphs, in the dead wood traps the author has run. As well as being associated with ivy and holly, it occurs in moss (Le Quesne, 1960) and may occasionally hibernate in dead wood or, perhaps, any suitable sheltered habitat for short periods.

Another interesting case is that of the widespread, small cranefly *Ormosia nodulosa* (Macquart). This is thought to breed in woodland soil (Stubbs, 1994) which it may well do but, in my experience, adults are regularly found in dead-wood emergence traps. I think it is important to record these various 'accidental' occurrences since, as more experiments are undertaken in different places, the inexplicable may become explicable. The biotic effect of dead wood has many subtle ramifications in addition to its importance for obligatory, primary dead wood feeders.

There are some interesting comparisons between this project and other work on the insects emerging from saproxylic habitats. Kirby & Buckley (1994), for example, studied the insects from dead wood in Hatfield Forest that had lain on the ground for two years having fallen in the great storm of 1987. The Hatfield Forest study

recorded far more Coleoptera, probably because of the rather different trapping technique used as well as the greater quantity of material studied. However, the chandelle in Sedlescombe produced micro-Lepidoptera and a number of Diptera from the Hybotidae, Dolichopodidae, Phoridae, Syrphidae and other families that were not represented at Hatfield. I imagine this is because the Sedlescombe chandelle had been a dead wood habitat for far longer.

With nearly 90 species from Sedlescombe, compared with 127 from Hatfield (where eight Owen traps and a range of woods were used) and 36 known saproxylics, or saproxylic-fungus breeders from Sedlescombe compared with 52 for Hatfield, there is a strong inference that the dead wood habitat continues to attract new species for far more than two years and may have a 'climax' period when the greatest number of species is reached.

A chandelle is, of course, a rather different habitat than a log of equivalent size lying on the ground. The wood tends to be drier and more powdery and there are different microclimates. There is also, of course, the decaying root system in the ground below. In the case of the chandelle in Sedlescombe, I have found all the species elsewhere in the vicinity, often in association with dead wood, and I have not been able to discern any particular characteristic that might be attributable to this particular type of dead wood habitat. However, since it is easy to fit a netting sleeve over a suitable chandelle, other entomologists may be interested in repeating this exercise elsewhere.

This small experiment shows, once again, the ecological importance of dead wood (Speight, 1989; Kirby & Drake, 1993) even in small quantities in semi-natural situations. A mixed field hedge of any length would, for example, contain hundreds of pieces of wood similar to this oak chandelle. If the invertebrates I did not find or have not identified were included it might double, or even treble, the number of species known to be using the chandelle and there are also the lower plants and micro-organisms. A rather dull looking log of wood is in fact a habitat of great richness and variety.

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SIXTY YEARS OF *VOLUCELLA ZONARIA* (PODA) (DIPTERA: SYRPHIDAE) IN BRITAIN

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Abstract

The history of the hoverfly *Volucella zonaria* in Britain is reviewed. It shows that there was evidence of range expansion long before recorders were alert to such changes. Possible factors behind its expansion of range are examined and it is shown that the distribution maps closely fit those parts of England with the mildest winter temperatures and highest summer temperatures. Readers are alerted to the possibility that populations are reinforced by influxes from the Continent and that detailed recording of this species and known migrants might help to shed further light on this aspect of its biology.

Introduction

Volucella zonaria (Poda) is one of the largest and most readily identifiable of British flies. Its size alone marks it out as distinct, whilst its vivid chestnut and gold markings make it noteworthy as a hornet mimic. Thus, it is a species that can be recorded accurately by even the most casual natural historian. The only species with which it can be confused is *Volucella inanis* (L), which is smaller and yellower and has a yellow rather than black second sternite. Although it is more widespread, *V. inanis* occupies a similar range.

The arrival of *V. zonaria* in the 1940s was heralded by much interest in the popular entomological press. For a period of ten years, it featured regularly in notes and observations and was even reported in the national press. These reports, together with numerous museum specimens, provide the foundation for our knowledge of its arrival and establishment.

When compiling the provisional atlas of British hoverflies, we suggested that *V. zonaria* might be gradually spreading from the London suburbs into the wider countryside (Ball & Morris, 2000). As a relatively recent arrival from the Continent, *V. zonaria* is a potentially useful subject for monitoring as part of studies following the changes in invertebrate populations in response to climate change. This note tests the hypothesis that its distribution is expanding. It describes the establishment and spread of *V. zonaria* and evaluates its current status based on available data.

Early published history

Until the 1940s, *V. zonaria* was very rarely recorded (Fig. 1a) and, according to Goffe's analysis (1945), was represented by just six confirmed British specimens; although Hobby (1946) reported a further two old records. At that time it would seem that *V. zonaria* was a rare vagrant and it was treated as such in the annual migration reports until the 1950s (Danreuther, 1946, 1952). Goffe, however, also drew on records from Folkestone, Bournemouth and Bristol in the 1940s and suggested that breeding populations may have been established. Fraser (1945) reinforced this conjecture with a report of "at least 8 specimens... seen or captured in Bournemouth" in 1945. Further evidence of the establishment of a population at