Contribution to the knowledge of springtails (Collembola) from Cheshire (VC58)

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Introduction

In January 2008 I used the short time that I had available to search for spiders, other arthropods and insects, which could be readily found in my garden at night. The main arthropods found in this way have been springtails (Collembola) (Farrell & Janssens, 2008). These fascinating animals are both abundant and easily found - a good combination when time is limited. As a bonus from a photography perspective, they are also extremely attractive in many cases – although there are many grey species. Being so small - the ones found so far have been between 0.5 - 5 mm long - they are also a real challenge when it comes to obtaining a satisfactory photographic image.

What is a springtail?

This is quite a small group of animals with around 250 species in the UK. Collembola are in fact some of the most numerous animals on Earth and to be found in all habitats, being one of the few terrestrial arthropods to reach the Arctic Circle. As referred to above, many of the species are minute and must be keyed-out microscopically. However, many of the larger species can be identified at least to genus whilst still alive with a hand lens or under the microscope. Although they have six legs, they are not regarded by many experts as insects at all; being more accurately described as arthropods, arising from close to the common ancestor of insects and crustaceans, but this distinction is still hotly debated (Janssens & Lawrence, 2002-2008).

As many readers will be aware, the group gained the name springtail from the structure that most of the species have on the underside. This is a forked appendage (furca) that is flicked when they sense danger and projects them some distance from their original position. Most readers will not be aware that Collembola more accurately describes the structure that sets springtails apart. This structure is the ventral tube consisting of a pair of eversible sacs on the first abdominal segment. It can be more than twice the length of the body in some species and is used to right the animal after a jump. One of the forefathers of modern day recorders, Sir John Lubbock gave springtails the name Collembola based upon the Greek *Colle* (glue) and *embolon* (rod/wedge).

Recording

The first species I found was not surprisingly one of the largest and most obvious, *Orchesella villosa* (Geoff.). It was identified for me, from a photograph, by a very generous and learned collembologist in Belgium, Frans Janssens. I met Frans via the very useful photography storage and discussion site www.flickr.com. I have since found *O. villosa* to be common in all habitats and it is usually the first species I see in the garden when looking for Collembola. This latter fact is what made me somewhat surprised when I looked at the records detailed on an online map to discover that *O. villosa* had apparently not been recorded in Cheshire before. I eventually contacted Peter Shaw, the National UK Recorder for Collembola, and he confirmed this was the case but that this was almost certainly due to a lack of recorders - a familiar story to many of us I am sure!

This exciting find (for me anyway!) encouraged me to look at what other species lay in my garden and beyond. Using straight-forward hand searching methods I looked under logs and stones, and in leaf litter and it became immediately obvious just how common these animals are, and apparently in all habitats. It is now common practice for me to collect a sample of leaves and leaf litter from a new site and see what can be recorded within the sample. I now also use a much more efficient method, sieving leaves into a bowl and then assessing the debris. This type of recording reveals not only good numbers of Collembola but also many other animals of interest such as Pseudoscorpionida, Heteroptera, Arachnida, Myriapoda, Isopoda and Coleoptera among many others. In my limited experience it is a super way of finding a vast range of animals for little effort and negligible disturbance to the habitat and its inhabitants. It is important wherever possible to return the leaf littler and contents back to the original site. A pooter is the most useful device for collecting these tiny animals.

The recently published AIDGAP key to Collembola of Britain and Ireland (Hopkin, 2007) is easy to use and provides a definitive identification to all known UK species. It was developed with a view to stimulating interest in this group and is a massive step forward in this process. Partly through the use of the key and partly via photographic confirmations, I have now managed to confirm the following species in Cheshire:

Entomobrya albocincta (Temp.) - Romiley, common
**Entomobrya intermedia* Brook - Romiley and Chadkirk, common
**Dicyrtoma fusca* (Lubb.) - Goyt Valley, Lower Bredbury, two found in one short search
Dicyrtomina ornata (Nicolet) - Gee Cross
**Dicyrtomina saundersi* (Lubb.) - Romiley and Chadkirk, regular
**Hypogastrura purpurescens* (Lubb.) - Romiley and Chadkirk, common
Isotomurus palustris (Mll.) - Romiley, Chadkirk and Gee Cross, regular
Lepidocyrtus cyaneus Tull., 1871 - Romiley and Chadkirk, common
Neanura muscorum (Temp.) - Gee Cross
Orchesella cincta (L.) - Romiley, Chadkirk and Gee Cross, very common
**Orchesella villosa* (Geoff.) - Romiley, Chadkirk and Gee Cross, very common
Pogonognathellus longicornis (Mll.) - Chadkirk and Gee Cross, common
Protaphorura armata (Tull.) (tentative identification) - Chadkirk, abundant
Tomocerus minor (Lubb.) (tentative identification) - Romiley and Chadkirk, abundant
**Vertagopus arboreus* (L.) - Romiley, regular

The species marked with an * above are all new records for the county of Cheshire (VC58) and it really does confirm how seriously under-recorded this group is. The above comments on occurrence at the three sites studied are not statistical by any means, being for illustration only and to give an indication of abundance. The fact that seven of the larger and very obvious species are new to Cheshire and that the whole list for the county stands at only 46 species, illustrates how many species are yet to be found with a little effort. I also recorded *D. fusca* at Mold in North Wales and this will be a first record for Wales when confirmed by Peter Shaw. It was Peter who kindly provided me with the current list below and also confirmed that the central database has had no new records for Cheshire since 1970!

Checklist of Cheshire Collembola

Anurida maritima (Guérin)
Anurophorus unguiculus Bag.
Archisotoma besselsi (Packard)
Bourletiella arvalis (Fitch)
Bourletiella hortensis (Fitch)
Ceratophysella denticulata (Bag.)
Ceratophysella gibbosa (Bag.)
Ceratophysella longispina (Tull.)
Ceratophysella scotica (Carpenter & Evans)
Desoria olivacea (Tull.)
Desoria tigrina Nicolet
Dicyrtoma fusca (Lubb.)
Dicyrtomina minuta (Fab.)
Dicyrtomina ornata (Nicolet)
Dicyrtomina saundersi (Lubb.)
Entomobrya albocincta (Temp.)
Entomobrya multifasciata (Tull.)
Entomobrya intermedia Brook

Entomobrya nivalis (L.)
Heteromurus nitidus (Temp.)
Heterosminthurus insignis (Rt.)
Hypogastrura manubrialis (Tull.)
Hypogastrura purpurescens (Lubb.)
Isotoma viridis Bourlet
Isotomurus palustris (Mll.)
Isotomurus plumosus Bag.
Lepidocyrtus curvicollis Bourlet
Lepidocyrtus cyaneus Tull.
Micranurida granulata (Agrell)
Neanura muscorum (Temp.)
Onychiurus ambulans (L.)
Orchesella cincta (L.)
Orchesella flavescens (Bourlet)
Orchesella villosa (Geoffr.)
Pachyotoma sphagneticola (Bag.)
Pogonognathellus longicornis (Mll.)
Protaphorura armata (Tull.)
Protaphorura pannonica (Haybach)
Pseudisotoma sensibilis (Tull.)
Sminthurinus aureus (Lubb.)
Sminthurus viridis (L.)
Tomocerus minor (Lubb.)
Vertagopus arboreus (L.)
Willemia anophthalma Bürner
Willemia denisi Mills

Predators of springtails

Given the abundance of these animals, it is not surprising that they are an essential part of the soil biodiversity and food-chain. A number of arthropods, but principally arachnids and in particular, pseudoscorpions, mites and small spiders predate them. The former two are well adapted for living in the leaf litter and soil and I have found high abundance of mites in every sample I have ever sifted through. Although springtails only have rudimentary eyes (a composite eye made up of up to eight ocelli) or are even blind in many cases, they often show a good awareness of what is around them. On a number of occasions I have seen springtails stop still and apparently watch a mite crawl past to ensure it is not going to attack them. The photograph here of one of the *D. fusca* I found in Cheshire was doing just this. I have also noted springtails apparently infested with ectoparasitic nematode worms.

Conclusion

The apparent rarity of these interesting and attractive arthropods appears not to be an accurate portrayal of the true status; rather, it reflects the lack of recorders. Given the recently published key to the Collembola of Britain and Ireland. If anyone is at a loose end and can not find anything in their normal interest, it is recommended to turn over a log or a few stones and to see what jumps out - quite literally! Hopefully this recent publication will help to increase interest.

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References: **Bellinger, P.F., Christiansen, K.A. & Janssens, F. (1996-2008).** *Checklist of the Collembola of the World.* http://www.collembola.org. **Farrell, S. & Janssens, F. 2008.** *Contribution to the knowledge of the Collembola from Cheshire and Derbyshire, UK.*, Checklist of the Collembola of the World. http://www.collembola.org/publicat/farrell.pdf **Hopkin, S.P. 2007.** *A key to the Collembola (Springtails) of Britain and Ireland.*, AIDGAP, Field Studies Council. **Janssens, F. & Lawrence, P.N. 2002-2008.** *Are Collembola terrestrial Crustacea?*, Checklist of the Collembola of the World. http://www.collembola.org/publicat/crustacn.htm