Galea

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Suck and See What You Get

Many of us find and collect pseudoscorpions by searching under the bark of trees, beneath stones, amongst rotten wood, bird nests' and leaf litter. A cursory examination of the database clearly reflected these preferences. Unfortunately, I have not had the time to make a more detailed analysis of the habitats from which the records have been taken. This is largely because many recorders have not made a note of this useful information. This applies particularly to the older records. However, the habitat can often be inferred from the details of the locality. It is therefore essential for recorders to make a note of the habitat from which they collected their specimens. Ecological data of this type is proving considerable useful for both species and habitat protection.

As far as pseudoscorpions are concerned, habitats that are under-recorded include grassland and heathland. In the past agricultural researchers have predominantly been the sources of pseudoscorpion records from grassland and agricultural crops. Low-lying vegetation of this type does not appear to attract the casual naturalist in the same way as woodland leaf litter and rotting oaks. An important problem with finding pseudoscorpions amongst grass is that of sampling. Tearing up clumps of grass and then sieving is not particularly environmentally friendly and likely to make you very unpopular with reserve wardens. Scrabbling around on hands and knees to find them without destroying the habitat is fairly doomed — it is virtually impossible to spot such a small well camouflaged invertebrate amongst all the roots and soil debris.

So how do can you find them? Agricultural researchers use vacuum samplers which until relatively recently have been far beyond the pocket of most people. Commercial backpack machines cost hundreds and more, but now the domestic garden industry has come to our aid with the garden vacuum/leaf blower. G-vac sampling, as it has become known, is very efficient, relatively inexpensive (super-stores sell them for around £90) and easy to use, if a little noisy. It is quite astonishing to see just what is present lurking amongst all that dense grass and prostrate herbs. A fine mesh bag is placed in the entrance of the machine and held firmly in place (if not it can get sucked in a jam the works!). Alternatively a separate cylindrical container with a mesh base can be inserted into the nozzle and removed for emptying. The design of the collecting mechanism will depend on the ingenuity of operator. I use a muslin bag (bank or flour sample type which are the right diameter for the model vac. I have). This is slipped into the nozzle and the top rolled over the lip of the nozzle where it is held in place by a plastic tie. A coarse mesh filter is placed over the entrance to stop large leaves and other debris being sucked unnecessarily into the bag. I am also making a simple container with a gauze base that will slip into the nozzle and make emptying easier. As it is the bag inside the nozzle has to be turned inside out and shaken into a plastic bag. Once the contents are inside the bag a small piece of cotton wool soaked with a few drops of ethyl acetate is placed inside to render the occupants inactive. Failure to do this will by the end of the day result in you ending up with a few very content and well-sated spiders only in the bag!

There are vacuum samplers on the market design to catch the prey and deposit it within a see-through container for sorting alive. This is perhaps less destructive as you can select speci-

mens for use and release the rest, or identify them live and then release. Details of such systems and other samplers can be found on the Internet by typing, within quotes viz.

"vacuum sampler"insects.

No doubt, those who have the ingenuity can come up with a design to fit a G-vac.

The method is so efficient that even mites are trapped. I first used the device on a well-cut garden lawn and the results were staggering. No more than about 20 seconds of sucking are needed to yield a huge variety of arthropods and in quite staggering numbers.

The technique works well for all kinds of vegetation from the canopy down, but it is low down, at ground level, where pseudoscorpions can be found. I discovered this whilst collecting for bugs in some maritime vegetation types. *Dactylochelifer latreillei* appeared in amongst Sea Purslane and Sea Lavender on a salt marsh, and amongst dune grasses. However, the most productive habitat was the side of the sea wall abutting the salt marsh where three species appeared: *D. latreillei*, *Chthonius kewi* and *Neobisium carpenteri*. *Dactylochelifer* was particularly prominent in the sample with several life stages present. It would have been extremely difficult, time consuming and very destructive to try to sample this habitat for pseudoscorpions any other way. As it was, a 20-second suck produced ten specimens of three species. Refining the technique of using the machine could well produce better results.

Chthonius orthodactylus occurs, amongst other places, low down in grass tussocks. Collecting and recording this species might also benefit from using a G-vac. Of course although we are dealing with pseudoscorpions here, it might be worth remembering the harvestmen and spiders. Spiders form a large part of the non-insect catch collected when G-vacuuming, however most specimens caught are juveniles and difficult to identify.

Apart from the obvious efficiency of the G-vac. over other techniques, the results raise an interesting question, some challenges and research opportunities. What were the pseudoscorpions doing and where were they positioned in the habitat when they were sampled? Clearly, they must have been on or near the surface of the soil/litter, or vegetation, or in crevices in the grass leaf (on good advice I originally collected *Dactylochelifer* from the leaf bases of marram grass — very destructive to sand dunes!). Were they actively hunting in the open? We know virtually nothing about the daily activity of these creatures. Nor what they get up to in their day-to-day lives. There are virtually no accounts of their daily behaviour. Do they venture out from beneath the bark or dead leaves to hunt and find a mate? If so, when do they do this? Are they nocturnal? Do they show diurnal vertical migration, venturing into the open at dusk or in the night? For the G-vac. to pick so many up, especially the *Dactylochelifer,* suggests that they animals were in the open doing something. Other specimens of this species can be found readily beneath pieces of driftwood that are in the dry well above the mean high water mark. When found they are on the under surface of the wood, i.e. upside-down, and sitting still until the light stimulates them to do a runner and find a crack to hide in.

My thanks to James Bell for stimulating me into using my G-vac for pseudoscorpions.

Of Myrtle and *Sphagnum*

Bogs and *Microbisium brevifemoratum*

Whilst on the subject of G-vacs it is worth while highlighting the need to examine *Sphagnum* in bogs, at least the aerial parts of this plant where it forms an extensive cover. Searching this habitat in this way might well provide specimens of our most recent pseudoscorpion to be put on the British list, *Microbisium brevifemoratum* which in main-land Europe is restricted to *Sphagnum* in old mature bogs and mires. *Neobisium carcinoides* can also be found here, but then this species turns up nearly every where and is our most frequently found northern upland species. We know very little about this species which appears to be associated with relict bogs. Go on, if you have a suitable machine, try it and let me know what you find.

Photography

Over the years, I have accumulated photographs of pseudoscorpions. The obvious difficulty with this is the fact that these arachnids are very small and so require careful and somewhat specialised techniques to photograph them. The 'average' macro lens will provide a small speck on the final photograph and if you are lucky, you can make out the genus. Magnifications much greater than one to one are really needed if you want to see any detail. I have a library of images of most of the British species but many of these were taken a long time ago using artificial light and preserved specimens under a stereo microscope. By using controllable flash, as on the Olympus systems, it is relatively straightforward to take pictures of live specimens both microscopically and macroscopically. The chief difficulty is that they won't sit still for long. You have to have a way of following them horizontally as well as vertically and at the same time keep focus and be able to fire the camera/flash assembly. I use a laboratory jack for vertical movement having toyed with a small car hydraulic jack. For horizontal motion I have a microfiche tray from a scrapped fiche/microfilm reader. This has nice ball bearings to give smooth motion. The flashes, I use up to three for modelling purposes, are fixed close to the lens using laboratory clamps and powered of the mains for economy. Finally the camera body is fitted with a motor-wind and is electrically tripped using a foot-operated switch. This way you don't need two pairs of hands.

In the field the minimal I use is a macro lens (Vivitar auto macro zoom giving a maximum of 1:1). Adding a 2 X converter nearly doubles the image size. With the addition of an inverted standard 50mm lens mounted on the front of the macro (without the converter) very acceptable results are obtained with the pseudoscorpion taking up about 15% of the width of a 35mm slide. Yes, I do use this in the field! It does need a steady hand, but I have a Heath Robinson contraption to hold the camera, lens and flashes which I trigger using grip mounted with an electric release fitted into the motor-wind. The working distance is not great and does present difficulties in preventing the flash-guns interfering with the surroundings — they can bash plants and frighten the subject run off. Another problem is the difficulty in locating the subject. The subject being very small and often active can prove quite a challenge when your field of view is only a centimetre and half or less. For all photos, I use the lens stopped down to its maximum of f32. If you do use a 50mm on the front do remember not to stop it down else you will get vignetting and end up with a nice clear small circular picture in the middle of you slide.

For help with identification work I have made a lens adaptor for the Museum's simple digital camera. This works well but the 'intelligence' of the camera can be frustrating as it argues with me over the focus and when to take the shot! Later models have an over-ride which allows the user to have their say. For a quick relatively low-resolution image, it beats film — and you can see what you have straight away. Put the image in PaintShop or PhotoShop and you can do all manner of things with it. If anyone needs an identification this is ideal as you can enhance the image and select exactly what you want then send it off to an expert. I am quite happy to accept such images for identification purposes.

I now want to try to get as many of the British species live on film. If anyone else has done this and has images I would very much like to know and perhaps they could share the techniques they use to get the results. I am no expert photographer and have learnt the hard way (with the help of Alfred Baker's: Scientific Photography 1977, WH Freeman which I thoroughly recommend).

Chelifer and *Larca*

Don't forget to search those old nests inside hollow trees. You could be lucky enough to be the second person to find Larca lata. This, one of the rarest of our species, is restricted to ancient woodland. Sieve nests and old dry decaying wood inside rot holes and tree hollows.

Left:
long arolium
of *Larca lata*
Right short
one of *Chelifer cancroides.*

New Key

Francis Farr-Cox has been field testing a revised key. Once I get the results and comments back from him I will attempt to suitably amend it and produce copies for all recorders.

I have also developed a Microsoft Access 'key', or rather pictorial identification system for pseudoscorpions. With this it is not necessary to follow the typical 'key' technique of starting at '1' and working through the alternatives until you hit the species you think and hope is correct. The database is set up in Form View with three screens (depending on your resolution setting) that present all the significant characters with their different variations. The user can choose any one and by repeatedly doing so reduce the choice of species down to the species they are looking at. In other words, you do not have to go through any order or sequence typical of binomial key. Pick obvious characters in any order and work through by selecting (this is done for you) until a single species is left. You could pick colour, division of tergites, thickness of palps or anything to start off and proceed through the choosing what ever feature you felt like. As you select, the full details of those left in the selection (starting with the initial 27 UK species) are displayed within the three screens together with an image. You could even just flick through and look at the pictures. Ultimately I would like to add photographs as well as line drawings.

The system system will be trialed when it is complete to see how it works; how 'user friendly it is'. Any comments or suggestions would be most welcome. It will be produced on CD rom.

Records Received

There has been a drop in the number of records received over the past year, down to a little over 50. Despite this the steady trickle helps adds to our understanding of the distribution of these creatures. Let us see if next year we can double this number!

Thanks to all those who have contributed.

Gerald