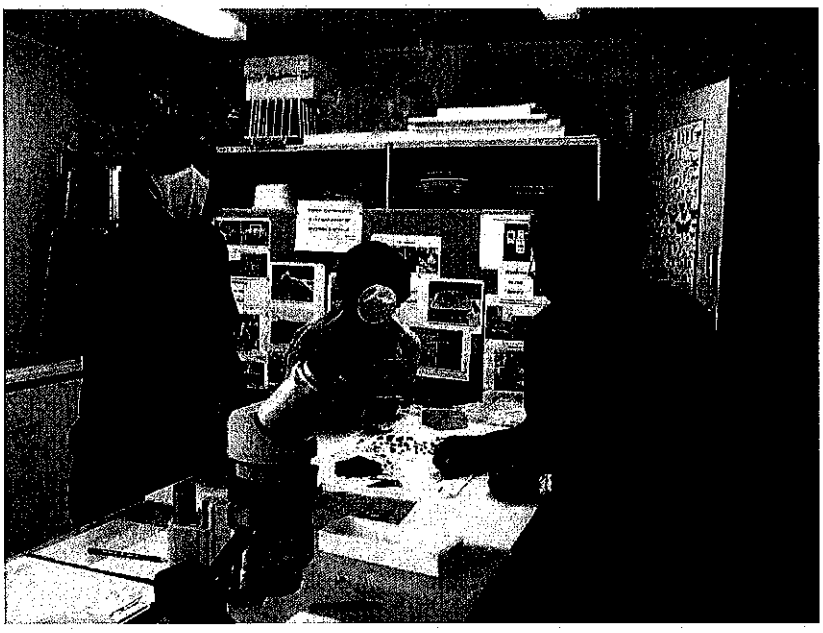
Environmental Biology Work Experience 301



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Dec 2009 – Feb 2010

Department of Environment and Conservation,
Manjimup, Western Australia

Supervised by: Alan Wills & Dr Janet Farr

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Signed

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1) Introduction

Throughout the summer break of 2009/2010 I took part in the Walpole Fine Grain Fire Mosaic project, as part of the Biology Work Experience 301, through Curtin University. The aspect of this project focussed on was invertebrate assemblages. This involved field sampling and laboratory sorting for invertebrates, as part of the cross disciplinary study for the Department of Environment and Conservation (DEC). The aim was to measure the effect of applying a fine grain mosaic burn to biodiversity and ecosystem structure of the area. The study was undertaken north-east of Walpole in the Frankland State Forrest.

The sites were positioned in various locations around the Walpole National Park, and strategically located to provide relevant data on invertebrate response to prescribed burning. The combined sampling team of 11 strong was split up into 3. The leaders were Alan Wills, Janet Farr and Paul Van Heurck. These groups targeted different collection techniques but all work within the same sites. The group I was assigned to include myself, Daniel Panikar and Alan Wills. Due to our fitness levels exceeding the average of group, we were chosen to set the light traps, which were very labour intensive, due to the 15kg battery required to run the light. Pauls group also did light and pitfall trapping, while Janets group did a variety of manual collection techniques including the beat, sweep, litter search and targeted pursuit.

Our group's first task in the early stages of the week was to set out the light and pitfall traps, to allow for sufficient time for specimen capture. The light traps were to be collected the day after setting, and the pitfall traps were to be left for 8-10 days. We got to 6 Sites each day and set one light trap per site. We left at 8 am every morning and followed a similar routine to the previous day, however this time we collected the contents of the light traps. Once all the sampling had been completed, they were stored at Manjimup DEC office.

We returned in February 2010 to sort and identify these samples to provide the data for the project. The following report documents the duties performed, limited results and interpretation of the overall project, and a diary of the major events of the work experience.

2) Field Work

The Sampling team for this study consisted of 3 senior entomologists Janet Farr, Alan Wills and Paul Van Dyke and 8 volunteers, including myself and 2 others from Curtin University, Daniel Panickar and Gemma Grigg. I assisted in field sampling from 7-13 Dec 2009 at three main site types comprising sedge, jarrah and sheoak, with a total of 24 sites. Sampling involved both trapping and hand collection. Trapping was conducted using both UV lights and Pit-falls erected on all sampling grid sites.

Figure 1. Tools used in the sampling including sweeping nets (centre).

a) Trapping

i) Light

Duties in this role were to firstly set light traps, which involved carrying a 15 kg deep cycle battery into each site, plus setting the pitfall traps. Tools carried manually to each sampling site included UV light, Thermometer, Heavy duty battery, Ockie straps, Insecticide in bucket to stop spoiling. The light trap was left over night and the samples were collected the next day. The thermometer indicated the lowest and highest temperature the site was exposed to. This was a physically demanding role due to the distances travelled on foot.

ii) Pitfall

This technique used vials which were buried, to the same level as the ground, and filled with alcohol and glycerine. This liquid would retain the insects which fell into the trap. These were set and collected after a 10 day period.

Figure 2. Common example of a pitfall trap.

b) Manual Sampling

Hand collection was achieved on standard established sampling grids across all sites using sweeping, beating and habitat searches in coarse woody debris and litter. I had limited experience into these tasks as I was part of the light trapping team.

i) Beating

Figure 3. The net used to catch insects via the "beat" technique.

This was conducted daily at each site and involved beating the tree or shrub with a stick and catching the fallen insects.

ii) Sweeping

The sweeping was conducted by the manual collection team, at each of the 24 sites. This involved walking along a set path and sweeping the surroundings to catch insects. These were then put into vials and labelled for further identification.

iii) Targeted Pursuit

This technique was used to catch any insects visible and present in awkward locations such as in the litter or coarse woody debris. Again these insects were put into vials for storage and labelled accordingly.

3) Lab Work

This involved sorting and documenting all trap and hand collections in respect to capture sites, to order and morpho-species. This also included pinning and preservation of invertebrates as well as taking photographs for identification. Sorting was conducted 1-18 Feb 2010 at the insectaries in CALM Manjimup. We were located in Manjimup regional DEC office and the lab had many sample insects for comparison, which we mainly used to identify.

Data was recorded onto data sheets, then checked and entered into a computerised database storage system. Data are archived onto CD format and stored with the Forest Entomology Collection, Science Division Research Centre, Kensington.

a) Identification

This involved sorting through the field samples to identify the correct organisms present. Any invertebrate less than 10mm were not recorded as they would be too time consuming to record. The samples varied depending on their collection method.

i) Light

These were the first samples we sorted, they had to be stored in the freezer and so were the most urgent to prevent damage through storage. Due to the nature of light trapping we mainly collected flying insects (*Lepidoptera* and *Diptera*), however some samples were inundated with beetles (*Coleoptera*). An average site sample took half an hour to an hour to correctly record. We identified moths via size, wing shape, colour, wing pattern head size and shape, and proboscis (mouth parts). Types of moths we identified were Bogons, Slenders and Geometrics. Beetles were identified via their Pronata (head), mouth parts and hair segments. Wasps features of identification included wing venation and body size. The most common moth found was the *Opodiphthera helena.*

ii) Pitfall

The data samples have not yet been sorted and as such are absent from the results. However we had expected high numbers of *Coleoptera* and *Formicidae* species.

iii) Hand collection

These samples were slower to identify as they had a wider range of family variation. The main insects found included spiders, slaters, millipedes, centipedes and *Diptera.* These samples showed more variety and were less numerous (lower biomass).

iv) Voucher Collection

Also we had to pin and record some of the well preserved specimens, which then formed part of the voucher collection. This involved pinning the insect into a tray with a corresponding tag showing the date, site, collection method, species number and sample number (P2). Colours of the insects ranged from green pink yellow and grey and metallic.

b) Photography

This was undertaken to create computerised documentation of the species, which could be later used in identification. We used 2 cameras, a Nickon D70 which was Janet Farr's personal camera set up on a tripod and a Cannon Power Shot G6. This G6 was much more complex and had a conversion lens adaptor which linked the camera and microscope to the laptop which became the field of view when taking photos. This camera was useful for taking photos of very small insects.

c) Housekeeping

This involved cleaning all the used vials and light traps, as well as storing all the samples correctly. Sorting could be done if there were too many old containers lying around so we regularly stopped to clean them.

4) Results

In total, this survey indentified 14404 individuals, belonging to 504 different species. As it is a long term study, data is still being collected and interpreted and these results are just preliminary findings.

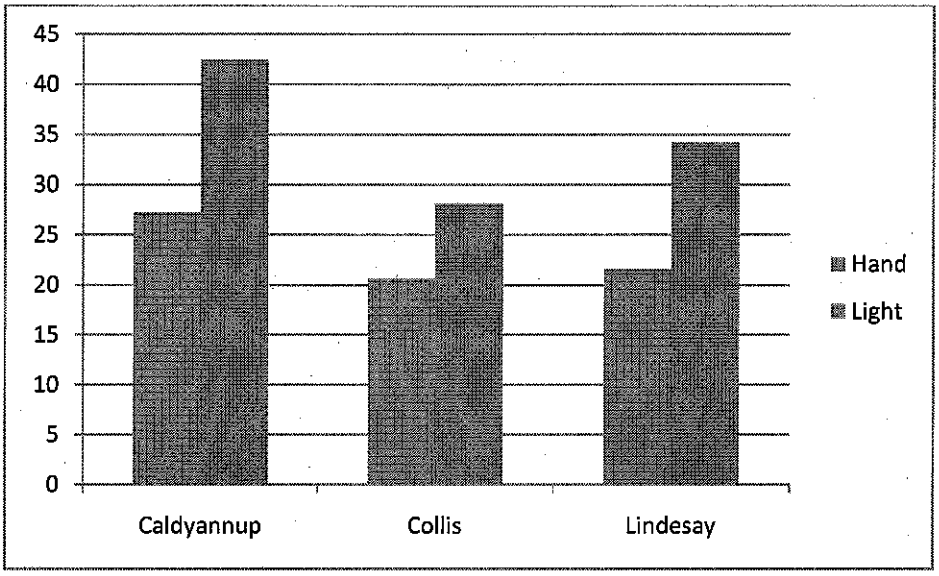

Figure 4. Shows the average number of species (diversity) found at each of the three types of sample, for both light and hand collection.

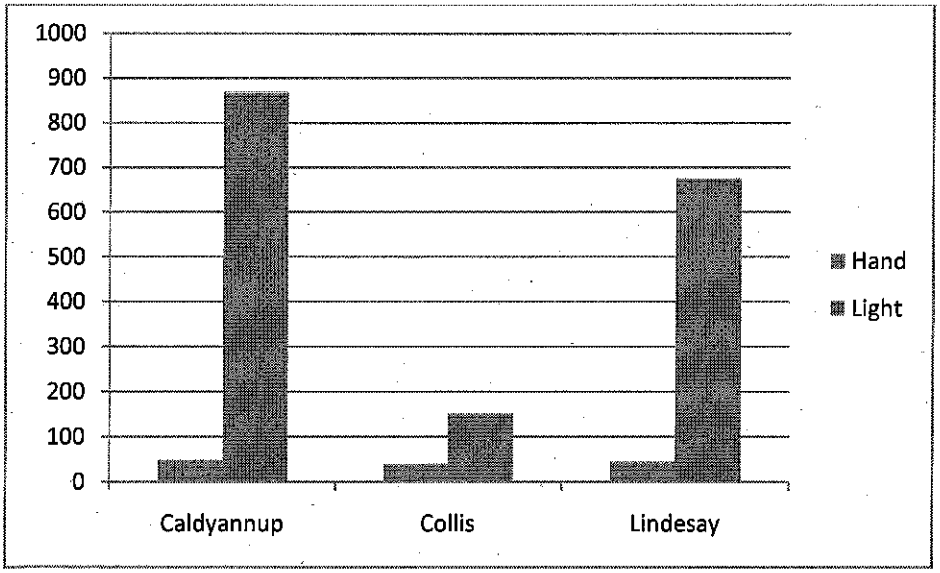

Figure 5. Shows the total number of individuals found at each of the three types of sample, for both light and hand collection.

One way ANOVA was completed for No species present vs. site type and no significant difference was found. This indicated that current fire regimes have little effect on reducing biodiversity of species in the Mt Frankland region.

5) Diary of Major Events

Day 1 - Monday 7th December 2009

Left Perth with Gemma and Dan, and arrived DEC office Manjimup 1.30. There we signed insurance forms and met the other team members. We helped to do food shopping in Manjimup, then drove to accommodation in Peaceful Bay.

The collection team consisted of 3 senior entomologists Janet Farr, Alan Wills and Paul Van Dyke. Accompanying them were 8 volunteers, including myself and 2 others from Curtin University, Daniel Panickar and Gemma Grigg.

Day 2 - Tuesday

Set Light and pitfall traps at 6 sites.

Day 3 - Wednesday

We left at 8 am every morning and followed a similar routine to the previous day, however this time we collected the contents of the light traps. Thus the same 6 sites were re-visited.

Day 4 - Thursday

We set another six sites with light traps and pitfall traps. As we finished sooner than expected we had time to meet camera people who were working on documenting the progress of the DEC in the forest check programs.

This can be viewed at http://www.abc.net.au/news/video/2010/07/30/2969621.htm

Day 5 - Friday

Similar to Wednesday, collected the light traps we had set.

Day 6 - Sunday

Set another six light traps and pitfall traps. Very hot day and quite tired due to limited rest. This was my last day in the field as I had to return to Perth.

Day 7 - Monday 1st February 2010

First day in the laboratory we met the laboratory sorting team, got supplies needed for the following weeks and settled into our accommodation.

Day 8 – Tuesday

Working days began at 8 am and work duties included identifying insects by their features. The insects were those collected on the 11th and 16th of December in light traps from various sites. Most of the insects were Lepidoptera with a few beetles, spiders and flies. At the start of the day each bag of insects took about 40 mins. At the end of the day we were much quicker and had learnt to recognise the different species and key them correctly.

At 10am we had a meeting with the director of DEC Mr Niel Burrows. He spoke about leaving his position as the director of the region and finances of the department.

Also we had to pin and record some of the well preserved specimens; this involved pinning the insect into a tray with a corresponding tag showing the date, site, collection method, species number and sample number (P2). Colours of the insects ranged from green pink yellow and grey and metallic.

Day 9 - Wednesday

Identified insects from Walpole fire management region sites 1-20. More beetles in the sample results in the moths losing their scales, thus distinguishing features, and they become harder to identify. Also did some macro photography of some insects. Saw some macro detailed photos that Janet has filed and saw her filing system which orders the identified and named (Pronotaxonomy) insects through site number mainly amongst other things. Allan Identified some insects which had been kept and breaded up in the laboratory.

Day 10 - Thursday

Did more sorting of light traps mostly moths and beetles

Day 11 - Friday

Sorted through the light samples.

Day 12 - Monday

Sorted the rest of the light traps and started sorting/identifying the hand samples.

Day 13 - Tuesday

8am start and sorted more hand samples, cleaned and dried vials and made new boxes and developed sorting system.

Day 14 - Wednesday

Used Microscopes to identify hemiptera, hymenoptera, and coleopteran species. Took photos of new specimens, both on a tripod and through a microscope camera. Kept identifying the hand samples from site 1-22. Found a big pray mantis (10cm) and glued a moth to its mouth and took photos

Day 15 - Thursday

Kept identifying hand samples, did photography and wash old vials. A new species were recorded as A1 (alcohol 1) and place in vials with alcohol and glycol for later identification.

Day 16 - Friday

All hand samples were completed.

Day 17 - Monday

Cleaning and drying vials to get them ready for the next sample program. Cleaned the light traps(22) buckets and funnel lids.

Day 18 - Tuesday

Cleaned the light timers and lights themselves and prepared all equipment for the spring field sampling to take place. (thermometers and torches). Finished cleaning and putting away all vials.

Took some photos of a pest species native to south Australia, which has been in an outbreak near Mandurah. It is a type of psyllid from the family psyllidae which can only be identified under a microscope. We took some representative photos of the samples and noted any observations. From these we were able to narrow down the identification to two species of which my supervisor was confident in naming it the Cardiospina Albidextura (white-likely), Cardiospina Denstexta(dark- not likely) or Cardiospina Jeramungup (shell shape) species. However both the samples and photos will be sent to Gary Taylor, of South Australia, who has more experience in dealing with psyllids and will be able to more accurately identify the subject species. The photographs as well as the physical samples will be sent to Gary for further investigation.

Day 19 - Wednesday

Started photographing alcohol stored specimens, this is done to make identification simpler and give computer storage and filing system of the alcohol samples. Took very detailed photographs of formidacea (ants) specifically mandibles, head, body shape and segmentation as well as eye position and head size.

Day 20 - Thursday 18th February 2010

For the last day I continued with photograph identification. Overall I found this a very worthwhile experience.

SCIENCE DIVISION, Manjimup

Department of Environment and Conservation
Our environment, our future

To: Prof J. Majers

School of Biology, Curtin University of Technology

From: Dr Janet D Farr

Date: 16/4/2010

Subject: SIMON LUNN WORK EXPERIENCE REPORT

Report on Work experience for Simon Lunn Dec 2009 and Feb 2010

Simon took part in the Walpole Fine Grain Fire Mosaic project, which involved field sampling and laboratory sorting for invertebrates. The project is a cross disciplinary study for the Department of Environment and Conservation (DEC) of the effect of applying a fine grain mosaic burn to biodiversity and ecosystem structure; and is located east of Walpole in the Frankland District at Surprise and London forest blocks. He assisted with field sampling 7-13 Dec 2009 in three main site types comprising sedge, jarrah and sheoak, replicated across a total of 24 sites. Sampling involved both trapping and hand collection. Hand collection was achieved on standard established sampling grids across all sites using sweeping, beating and habitat searches in coarse woody debris and litter, achieving four person hours sampling per site. Simon experienced all techniques, but was primarily employed with light trapping. Trapping was conducted using both UV lights and Pit-falls erected on all sampling grid sites. It was Simon's main task to set and collect light traps, which involved carrying a 15 kg deep cycle battery into or out of several sites per day; plus setting pitfall traps for a 10-day period.

Sorting was conducted 1-12 Feb 2010 at the insectary in CALM Manjimup. This involved sorting and documenting all trap and hand collections in respect to capture sites to order and morpho-species and included experience in pinning and preservation of invertebrates. During Feb 15-19 Simon organized the alcohol voucher collection and conducted repair and maintenance of our field and laboratory equipment associated with the project. Simon was also trained in macro-photography and remote digital photography using the stereo microscope for both auto-montage and single frame. He then photographed the formicid alcohol vouchers.

Simon demonstrated dedication, enthusiasm and initiative whilst working with us. He conducted himself safely and sensibly in the field. Simon is a very sensitive and intelligent young man and at one point during our field work had to excuse himself due to problems with stress. However he conducted himself responsibly and thoughtfully in relation to his duty to the project work and team environment and as a consequence spent an additional week in the laboratory. His contribution during this time was invaluable. His organizational skills and particular ability regarding attention to detail proved very useful in regard to management of the invertebrate collection. His skills in this area would naturally augment a career path in taxonomy.

Dr Janet Farr
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