

## Curating Insect Collections

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### Labelling specimens

#### Information required on insect labels

**Insect labels** can be handwritten or printed on card. All pinned specimens must have a label which includes the basic collection information: **locality, date & collectors name**. Supplementary information such as a host plant, habitat or collecting method can be included on a secondary label. **Keep labels as small as possible** to preserve space in collections.

For **locality**, always include as precise a location description as possible. Remember (especially if you do not have a GPS to record the location coordinates) that the location given needs to be able to be found by someone else at a later stage. Think and ask yourself - "If I didn't know anything about the place where this specimen was collected, would I be able to find the locality from the information that is given on the label?".

**Locality information to include on a label:** Latitude and Longitude, Country, State/ Province, Town/Village. If the location is outside of a town or village use a combination of distances, direction by compass, landmarks, waterways, reserve name or roads to describe accurately and succinctly as possible the location, e.g. 6.68°S 146.92°E (or -6.68, 146.92) PNG: Morobe Province: 10km NW of Lae on Highlands Hwy at Wau Rd.

Upton & Mantle (2010) also suggest including "GPS" on the label next to latitude and longitude if a GPS device was used to determine this. They also suggest for the locality description, to use a reference in km from the "nearest unambiguous point of reference" using compass points (where each point representing 11.25 degrees and 11.25 x 32 equals a full circle of 360 degrees) e.g. 10km NNW of Lae. It's another approach and may work better if you have a GPS to record the locality at site.

We recommend using a combination of both direction from a point of reference and landmarks or roads. If you don't have a GPS, recording information about the nearest cross roads etc in your notebook at the time of collection will help you to locate the spot on a map or Google Earth later (see Georeferencing resources below) and may also be more helpful for others to find the location at a later stage once the specimens are labelled and in collections (assuming the road names don't change too much).

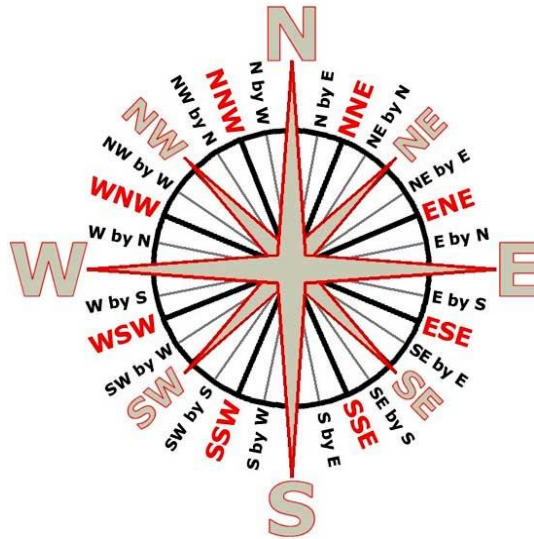


Image source:

<http://www.wavelengthphotography.com.au/bush&AlpineResources/Technical/CardinalPoints.asp>

For **date**, to avoid confusion between the day, month and year use the following format, with a number for the day, first three letters for the month and the year number in full without abbreviation, e.g. **24 Nov 2014**.

For **collector**, use their initials for first name and full surname, e.g. **S. Sar**.

#### Insect label examples

So, a resulting label may look as follows:

6.68°S 146.92°E  
 PNG: Morobe Province:  
 10km NW of Lae on  
 Highlands Hwy at Wau Rd,  
 24 Nov 2014, S. Sar

Examples of insect labels generated from coded information collected in a field notebook as in above example (pg. 11), where the collection codes are also included in the label as a reference:

#### Main label

AUSTRALIA: Northern Territory:  
 Fish River Station, transect M,  
 113m, 14.22°S 131.03°E, 29 Apr  
 2012, C. Symonds [BBFR12\_L12]

#### Secondary label

With supplementary information e.g. host plant, including who identified the plant and the herbarium voucher number for the plant sample identified

MALVACEAE *Grewia retusifolia*  
 Kurz, Det.: NT Herbarium,  
 D0217471 [BBFR12\_H35]

## Insect label specifications and formatting

**Label card recommended specifications** are: a fairly thin card around 200gsm weight, acid free archival quality, or made of 100% cotton or linen rag.

For **handwritten labels**, preferably use either a fine pencil or permanent (ideally archival) ink pen. These will also be fine to put in ethanol vials of wet preserved specimens.

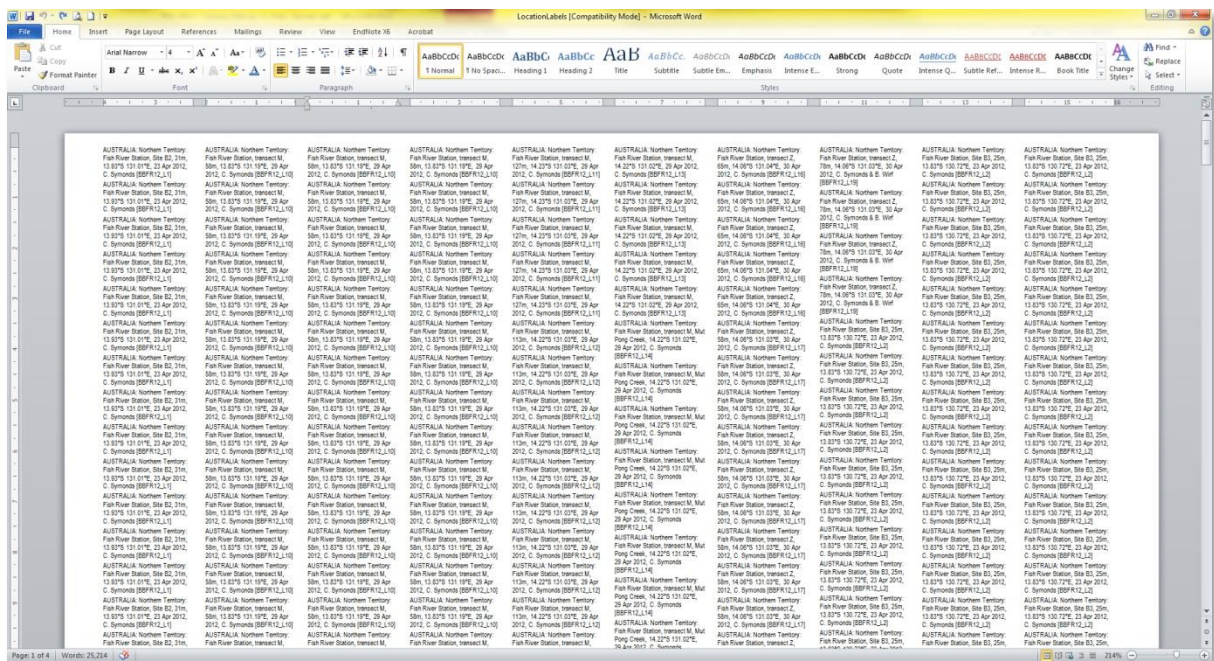
For **printed labels**, use a laser printer and set up a MS Word template label file as follows:

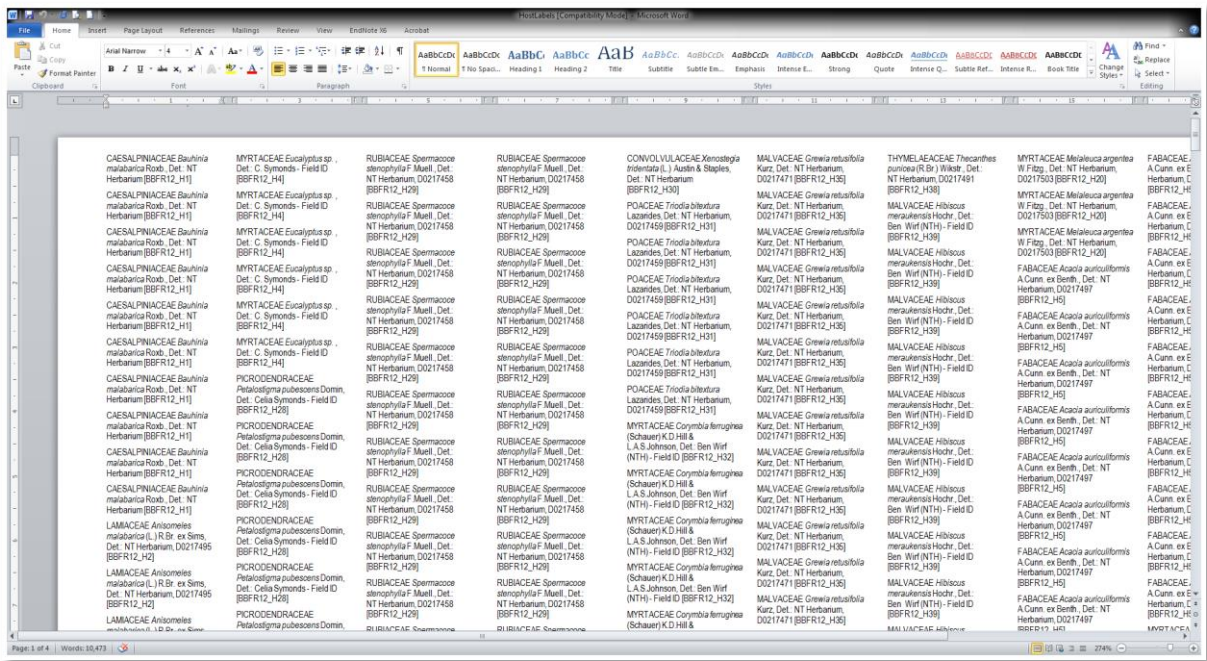
- Use columns (generally 10)
- Minimise page margins
- Minimise column margins
- Minimise space between labels
- Try not to make labels bigger than 2cm wide by 1cm high
- Font: Ariel or Ariel Narrow, Font size: 5 or 4.

For the font, keep it as large as possible and this may depend on how much information is on the label. Ariel Narrow is good, when there is a lot of detail in the location or host information, to keep the label small.

Enter all the collection information into your Word label template once and then copy and paste this till you have the required number of labels.

MS Word label sheets as examples for main locality labels and secondary host plant labels:





## Setting the ink on laser printed labels

For laser printed labels it can be a good idea to bake them in an oven low for 10 minutes or microwave at high for 1 minute 50 seconds, to set the ink to the card more strongly and this is a good idea if the labels are going in with wet specimen vials of ethanol.

## Georeferencing resources to find latitude and longitude coordinates without a GPS

If you have a locality name without geo-coordinates or if you don't have a GPS to record your location in the field, there are some different options to georeference a given locality.

The most useful, are:

- **Google Earth**, <https://earth.google.com>, an interactive world atlas with satellite photo layers. This is a free software application that can be downloaded to your computer.
- **Gazetteers**, e.g. *Papua New Guinea: national gazetteer of place names* by National Mapping Bureau, Port Moresby (1990) 669 pp.

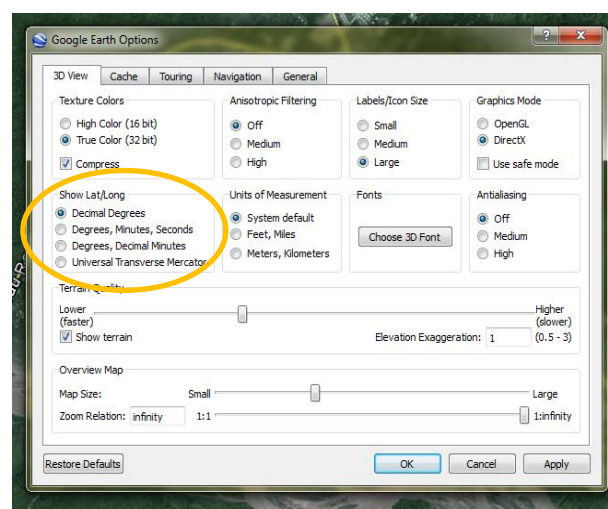
Other methods include using the GPS contained in newer mobile phones and digital cameras, GPS apps for smartphones and Google Maps to obtain geo-coordinates.

### Using Google Earth

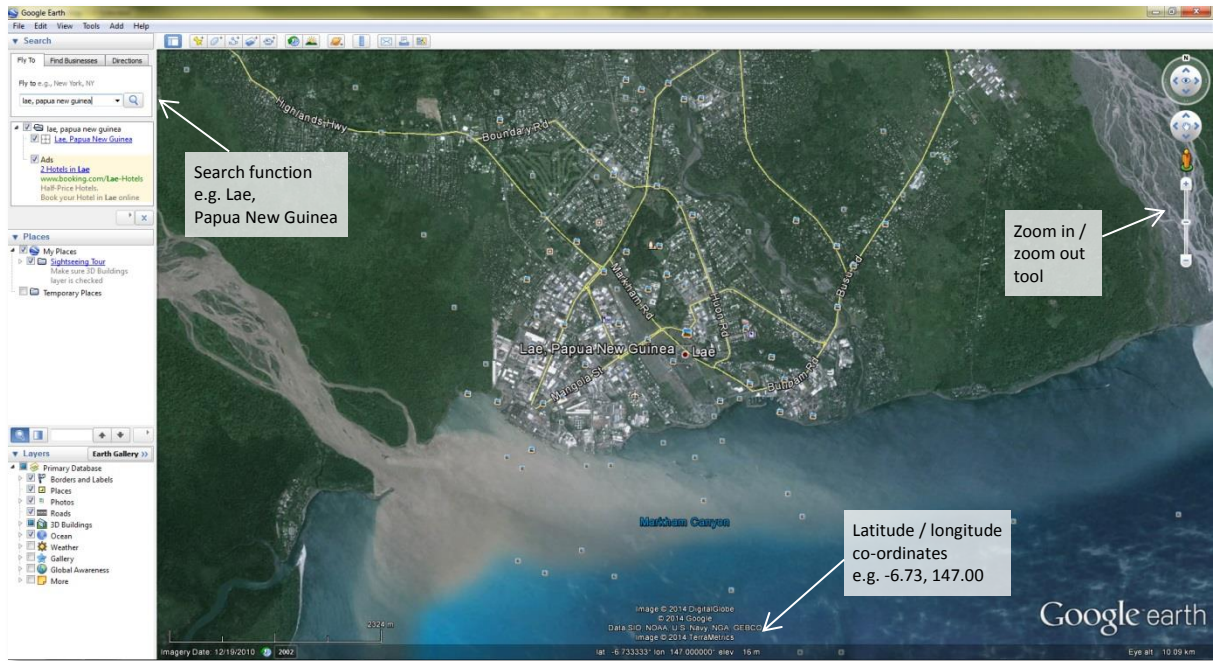
Go to <https://earth.google.com> on the web and click on the link to download. There are versions for Mac and PC computers.

Once Google Earth is installed on your computer you can search for locations to gather geo-coordinates. If you are after a specific location - e.g. on a small side road off the main highway just outside Lae - then it would be best to search first for "Lae, Papua New Guinea" and locate the exact point you are after using the satellite imagery with the mouse pointer by clicking and dragging across the page which moves the map (the mouse pointer (hand symbol) tracks the geo-coordinates as it moves across the map).

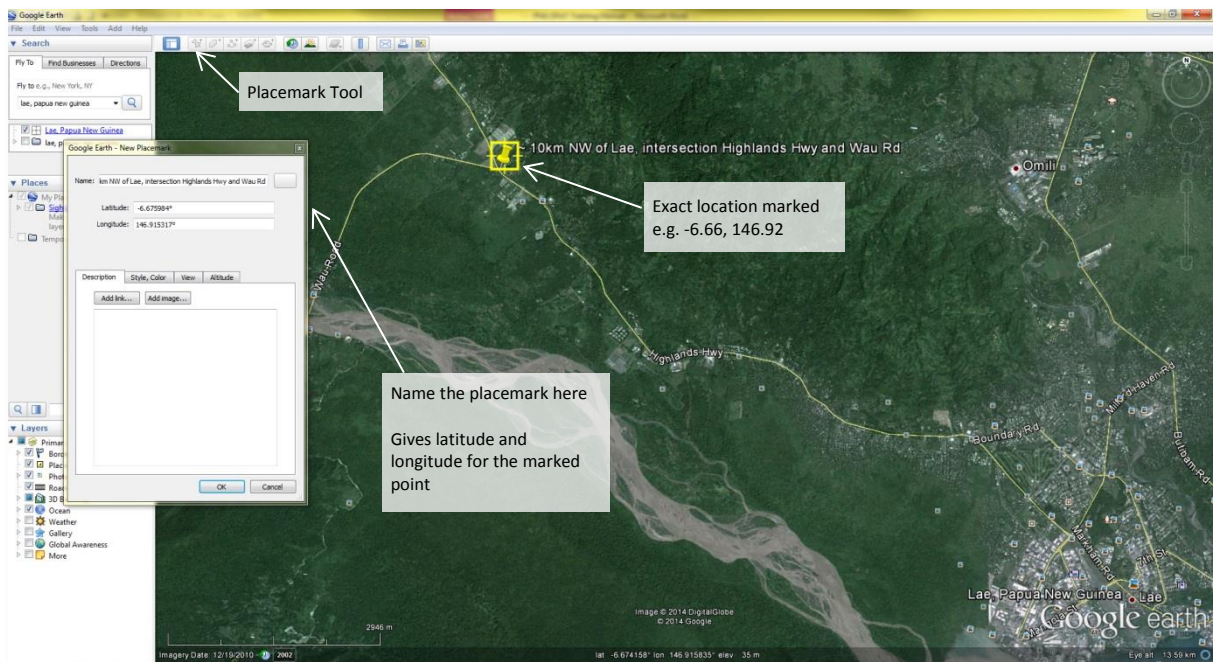
**Note:** Geo-coordinate format may be changed in the Options menu from between decimal format or degrees, minutes, seconds. Form the file menu select: Tools / Options / Show Lat/Long (make sure to click on the "Apply" button if you make any changes):



Screen capture image of Google Earth, searching for Lae, Papua New Guinea:



Screen capture of Google Earth, after panning across to NW of Lae, on Highlands Hwy at Wau Rd:



Note as above you can also set a placemark and permanently label (in popup box) placemark locations and they will be saved in your Google Earth.

## Correct positioning of insect labels

Specimens are always labelled **first with the main locality label**, then any secondary label with supplementary collecting information and then further labels as the specimens are identified or databased.

**Label position** varies depending on the specimen mount or pinning. Use the following photographs as a guide and note that it is important to always keep the text in the same direction. For pinned insects the top line of the label is always to the specimen's right, and if point mounted the top of the label is in the same direction as the top of the head:



Positioning the labels with the text in this direction, will ensure that the labels of both pinned and point mounted specimens are all facing the same way when the specimens are placed in a drawer, as below.

**Label height** can be determined and kept uniform across collections by using a stepped pinning block, with spacing left between additional labels added to the pin. It's a good idea to leave more room between the specimen and the locality label if it is a larger specimen but have the locality label at a height close to the specimen so there is room for other labels to be added later when specimens are subsequently identified and databased.



## Organising specimens in a collection

Specimens should be curated so as to use the space available as economically as possible whilst protecting the specimens from damage. Position specimens as close together as possible, but without touching and giving enough space for a specimen to be removed from the tray by hand without damaging surrounding specimens. Position pinned specimens so that the head is facing the top of the unit tray or drawer. Position point mounted specimens so that the tip of the point is facing the top of the unit tray or drawer, and position unit trays so the left side of the labels are all facing the back of the drawer, as in the following images:





## Storage of wet collections

To help prevent evaporation of ethanol from vials, the best type of vials to use for storage are those with tight fitting stoppers or screw caps such as scintillation or O-ring caps which seal better than other types of screw caps or press cap type vials. Vials should be stored in upright containers or within larger jars filled with ethanol (no image). As ethanol evaporates over time, wet collections need to be monitored from time to time and ethanol levels replenished when they are low.



### O-ring screw cap vials

Rubber seal in cap helps prevent leakage and ethanol evaporation

Plastic is HDPE (High Density Polyethylene) suitable for long term ethanol storage



### Glass scintillation vial

Note: Specimen labels should be placed inside vials always and never attached on the outside



Specimen vials of ethanol should be stored upright for long term storage

## Specimen storage and collection management in tropical environments

Insect collections need to be protected from **heat, light, humidity and insect pest damage**. This is of particular importance for dry insect collections and presents a greater challenge in a tropical environment such as in PNG, with high heat and humidity which in particular encourages fungal growth.

For this reason it is advisable to keep the bulk of specimen samples in your collections in ethanol. One collection management approach may be to store the bulk of sample series collected in ethanol and pin representative specimens as vouchers and for examination, whilst labelling the pinned specimens and ethanol vials for the same sample series in a way that they can be cross referenced at a later date.

Dry pinned specimens must be stored at all times in sealed storage boxes or drawers. **Naphthalene** is commonly added to storage containers – boxes or drawers - to prevent insect pest damage. Insect collections should preferably be housed in drawers, in air tight cabinets in an air-conditioned room. This will prevent fungal growth, insect attack and slow the evaporation of the naphthalene.

Further reading:

**Carter, D. & Walker, A. K. (1999). *Care and Conservation of Natural History Collections*. Oxford: Butterworth Heinemann.**

A comprehensive treatment of all aspects of management and conservation for natural history collections. All chapters of this book available online at the Natural Sciences Collection Association: <http://www.natsca.org/care-and-conservation>

## Further references and resources for insect preparation and curation

**Internet resources:**

**Museum Specimen Preparation Guidelines (incl. vouchers) – Entomology Research Museum, University of California Riverside**

This includes a comprehensive guide for best practice preparation and labelling of specimens, and in particular covers labelling requirements for quarantine and biological control voucher specimens and a guide to different preparation techniques for very small specimens e.g. chalcid wasps [https://entmuseum.ucr.edu/specimen\\_preparation/index.html](https://entmuseum.ucr.edu/specimen_preparation/index.html)

**Preserving Insects – Queensland Museum**

<http://www.southbank.qm.qld.gov.au/Find+out+about/Animals+of+Queensland/Insects/Preserving+insects>

**Specimen Preparation and Labelling in Ants (Formicidae) of the southeastern United States**

Step by step guide, with photographic images, to preparing point mounted specimens from field samples and curating series of specimens. Presented for ants but is a good general guide for point mounting procedure for small insects.

<http://mississippientomologicalmuseum.org.msstate.edu/Researchtaxapages/Formicidaepages/Specimen.prep.htm#labeling>

#### **Northwest Butterflies – Collecting & Mounting Specimens**

Guide to collecting and humanely killing butterfly specimens, with photos showing pinning and wing spreading of specimens.

<http://northwestbutterflies.blogspot.com.au/p/spreading-and-preserving-lepidoptera.html>

#### **Collecting and Preserving Insects and Arachnids – A Manual for Entomology and Arachnology by SAFRINET**

A very practical introductory extension guide to entomology, with simple illustrations, for collecting, preparing, curating, storing and posting specimens. This guide was targeted to workers in plant protection in Southern Africa and also includes a very basic key to insect orders.

[www.spc.int/lrd/publications/doc\\_download/339-bat-inse-scr](http://www.spc.int/lrd/publications/doc_download/339-bat-inse-scr)

#### **Books:**

Dahms, E. C., Monteith, G. & Monteith S. 1983. *Collecting Preserving and Classifying Insects*. Queensland Museum.

Upton, M. S. & Mantle, E. L. 2010. *Methods for Collecting, Preserving and Studying Insects and Other Terrestrial Arthropods*. Australian Entomological Society. 83pp.

Borror, D.J., DeLong, D. M. & Triplehorn, C. A. 1976. *An Introduction to the Study of Insects*. Fourth Edition. Holt, Rinehart and Winston, New York. 852pp