

Beginner's guide to preparing Coleoptera

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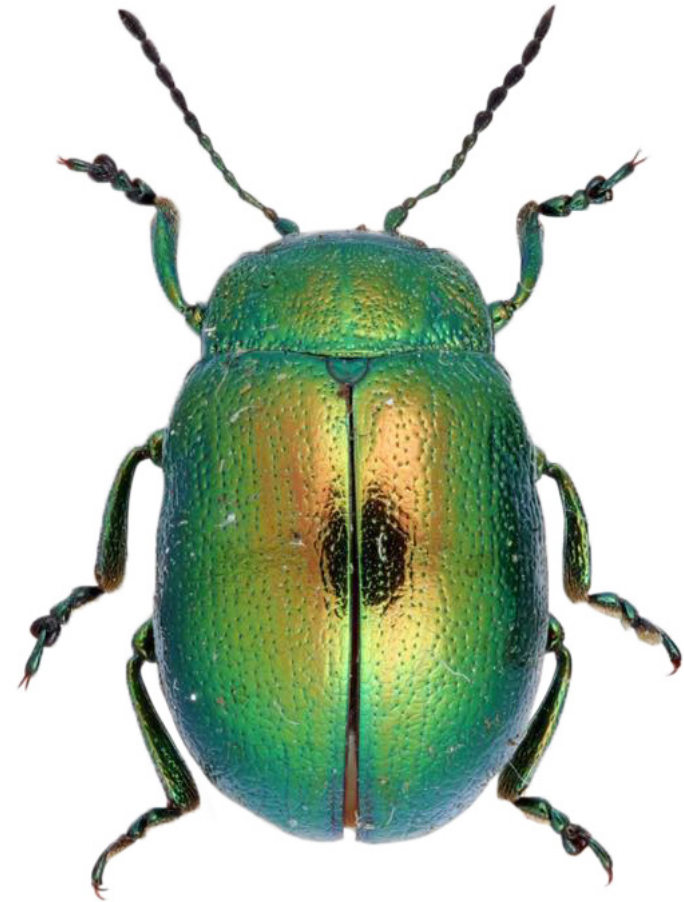
There are many different techniques used in the preparation of Coleoptera specimens and there two rules to consider when choosing an appropriate method:

1. Does the method chosen ensure the safety and longevity of the specimen?
2. Are the identification features presented in a way that they can be examined?

There both positive and negative points to all mounting techniques, but you have to try and pick the method that is best suited for your specimen. For example, when carding a beetle the underside is hidden from view, so when you try to examine the specimen's features you miss the dorsal side. Using water soluble glue is one way around this as it allows you to soak

the beetle off the card for examination. You can also identify your specimen before you mount it to avoid these problems, assuming you get the correct identification! Point mounting lacks the protection that the card offers, as specimens can easily be knocked off if handled incorrectly or if not enough glue is placed on the card. However, if the point is placed correctly on the underside of the beetle all of the identification features can be viewed easily.

This guide will take you through some of the key points to remember when preparing your specimens, to ensure you achieve a consistent specimen preparation that allows for safe and easy handling, identification and storage of your specimen and is equally applicable to dry preparation of many other invertebrate orders.



Preparation methods

There are three common methods used when preparing Coleoptera:

Direct pinning

The specimen is usually prepared on a setting board by inserting a pin through the right elytron of the beetle. If the specimen is larger the legs and antennae can be manipulated into place using pins.

Carding

Specimens are glued onto suitable sized cards where the legs and antennae are arranged for examination.

Point mounting

Specimens are glued onto small pointed cards which are placed on pins.

Specimens that are extremely small, soft bodied or in larval form can be kept in alcohol as a spirit collection.

Important tips:

Insects are bilaterally symmetrical and therefore any exclusive identification features may be present along the midline. When preparing specimens its important to try and avoid covering the midline of the beetles body to avoid destroying any key identification features.

Be mindful of the insect's legs, if the specimen is pointed will the insect's legs be damaged by labels underneath?

When direct pinning or pointing try and arrange the antennae to lay along the line of the body, don't have them projecting forwards otherwise they may get damaged.

Which method?

Generally the size of the specimen is the determining factor here. Is the specimen large enough to pin? If the specimen is greater than 1cm in length and is not soft bodied (i.e. families such as Cantharidae) then you can generally directly pin the specimen. Similarly, there are also mounting cards suitable for larger beetles so it's up to personal preference.

Think about the body type, does it have a hard cuticle or is it soft bodied? Does it have long antennae or legs that may get damaged on a pin?

Remember the two main rules and consider trade offs between the pro's and con's of your chosen method.

Size guide:

Greater than 1cm = direct pin or card

Less than 1cm = point mount



Basic preparation equipment

Pins

Pins are available in a variety of sizes. Generally sizes 3 and 4 are the most commonly used size, but size 2 can be used for more soft bodied or smaller specimens. Pins smaller than size 2 are potentially dangerous for the specimen as they are incredibly flexible and can cause specimens to shatter if the pin is mishandled.

Equally, it is important to avoid using pins that are larger in size (bigger than 3 or 4 for normal sized specimens) at an early stage of the specimen's life. Over time the specimen, card or point may become loose on the pin and will be prone to spinning. If you use a smaller pin size, it allows more flexibility to increase the size of the pin later on to stop the spinning.

Pinning block

To set the height of the specimens and labels you can use a metal pinning block, this allows you to set the specimen at one uniform height and the labels at corresponding heights underneath for continuity.

Paint brush

For arrangement of the legs and antennae when carding

Forceps

Fine and soft forceps to manipulate appendages and pick up specimens

Glue

To stick the specimen to the card or point, best to use water soluble glue

Paper towel

To remove excess liquid from specimens stored in alcohol

Foam/Setting board

Foam or plastazote setting board, this can be made using four sheets of plastazote layered on top of each other and pinned into place



Fig. 1: Basic equipment needed for preparing Coleoptera.

A: pins, B: pinning block, C: paintbrush, D: forceps, E: glue, F: paper towel, G: foam board

Direct pinning

When direct pinning the specimen is usually prepared on a setting board by inserting a pin through the right elytron of the beetle. If the specimen is larger, the legs and antennae can be manipulated into place using pins.

If your specimen has been collected in alcohol you will need to use a paper towel to remove any excess liquid. Place the specimen onto a foam board to protect the specimen and make it easier for you to work. Putting a sheet of paper over the top of the foam will protect the beetle's legs, sometimes the claws can attach to the foam and cause damage to the legs.

The pin should be placed through the beetle's right elytron (**Fig. 2**), (through the meso-thorax). Care should be taken to ensure the pin goes through the beetle's body so that the specimen is level (**Fig. 3A**). Make sure the beetle isn't slanted on the pin (**Fig. 3B**). Use a pinning block to set the height of the specimen on the pin, setting it at the highest possible level on the pin ensures room is left for extra labels. This also provides continuity of specimen height once in a collection.

You can then place your beetle back onto the foam board, push the pin down so the beetle is flush with the board. This will allow you to arrange the legs, if your specimen is smaller then there may be no need to arrange the legs or antennae. You can manipulate the legs and antennae so that they can be easily examined, this can be done by using pins to gently move the appendages into place. Never pin the legs in place by the claws, they may fall off when detaching the pin after drying. Specimens can then be left to dry for 1-4 days depending on size or they can be placed into a specimen drying oven over night at low temperature.

Try to ensure protection of the specimen when arranging the appendages, make sure they are placed in a way that avoids contact with labels and pins. Avoid direct pinning specimens that are too small and using pins that are too big, this can damage the specimen (**Fig. 3C**).

After the specimen is dry, gently remove the extra pins from the legs and antennae. Take extra care here as the specimens will be brittle now they are dry.



Fig. 2: Correct positioning of pin in the right elytron

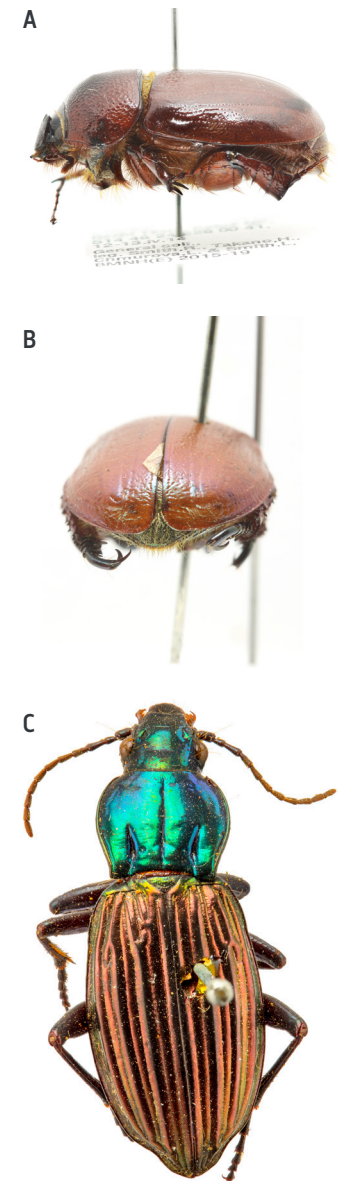


Fig. 3A: Correct angle of pin, B: Incorrect angle of pin, C: Damage caused by incorrect size of pin

Card mounting

Specimens are glued onto suitable sized cards where the legs and antennae are arranged for examination.

Card mounting specimens provides a good level of protection as the specimen is glued onto the card with the appendages arranged suitably for identification. However, the ventral side is not in view and therefore for some species can make identification difficult and the specimen may need to be soaked off the card.

If your specimen is wet, place it on a paper towel and gently pat it dry, you may want to leave it for a few minutes. This is a good time to pick the size card you need. Card mounts come in a wide range of sizes, you'll need to pick a card that best fits the size of the specimen, sometimes you get a perfect fit and other times you may have an odd shaped or sized beetle that doesn't seem to fit any of your card. Don't worry too much, just try and keep the specimen safe and ID features as visible as possible.

After removing excess liquid from the specimen gently manipulate the legs and antennae so that they are facing away from the body (this avoids unnecessary contact with glue on the card). Take a pin and place a small amount of glue in the middle of the card, then using forceps, pick up the specimen and place it centrally on the card leaving for a few seconds to allow the glue to set.

Then mix a water and glue solution (water and a few drops of glue in a the lid of a collection pot) and take a paint brush and gently arrange the legs and antennae down on the card ready for examination. Be careful not to make the solution too thick, otherwise you will get a film of glue over the specimen. Finally, insert a pin into the base of the card and set the correct height on the pinning block. **Figure 5** shows appropriate card mounted specimens



Fig. 5

Point mounting

Specimens are glued onto small pointed cards on which are placed onto pins.

Point mounting is a quick and effective preparation method for beetles. Specimens are point mounted by attaching the point card to the beetles underside (remember to always try and avoid the card crossing the midline to ensure visibility of all identification characters). This allows a clear view of all the ID features.

Prepare the point mounts before attaching them to the specimen. To do this, simply place a pin the in base of the point mount, the end that isn't pointed (Fig. 6B).

To attach the specimen to the point you will need to place the specimen on a piece on a foam board on its back with its head facing towards you. Take the point mount and turn it upside down so

that the pin point is in your finger tips, dip the tip of the point into a small amount of glue, then gently place the tip of the point onto the beetles underside between the mid and hind legs (meso-sternum). Your specimen should now be stuck to the point mount.

Sometimes when they are drying they can move off centre slightly, to avoid this you use a mounting board (as in the direct pinning description) and push the specimen so its almost flush with the board, don't push it all the way as it may fall off the point. You can then use pins to hold the point in place and then gently place pins next to the specimen so it sets in the correct way.

For specimens that have concave underside you can use forceps to gently bend the tip of the point mount to fit the beetle's shape (Fig. 6C). Finally, set the height of the beetle on the pinning block.

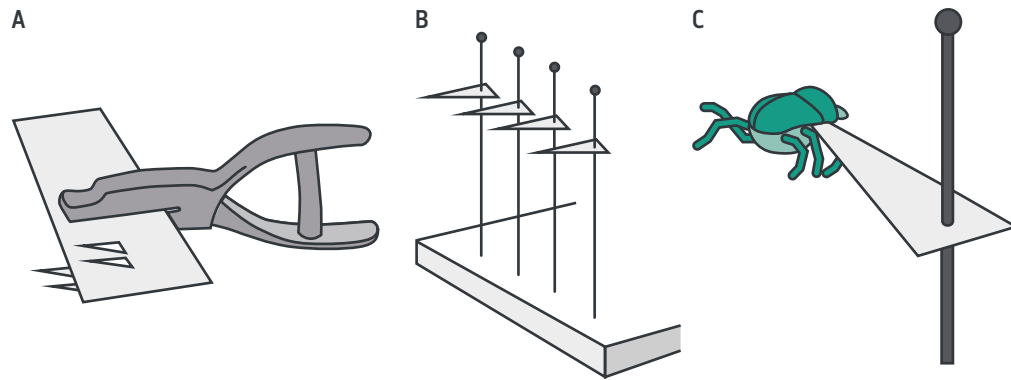


Fig. 6: Example of point mounts and placement of the mount on the beetle's underside

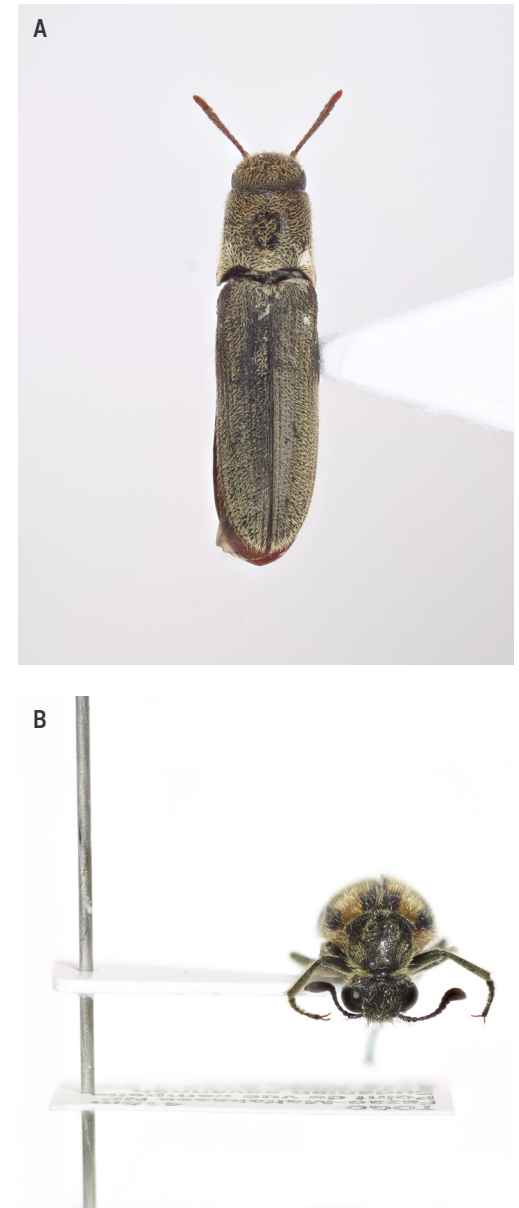


Fig. 7A and B: Correct position of point mounted beetle

This guide was originally produced as part of the Identification Trainers for the Future project and subsequently adapted and amended for the Angela Marmont Centre for UK Biodiversity.

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To find out more about the Angela Marmont Centre for UK Biodiversity and the Identification Trainers for the Future project, as well as our current training courses & programmes and sources of help with identification, go to nhm.ac.uk/take-part

Photo credits:

With a very special thanks to Keita Matsumoto for the use of his photographs to help illustrate this guide. Additional photographs taken by Katy Potts.



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