

KILLING AND PREPARING SPECIMENS

1. This session covers:

Methods of killing

How to preserve different insects?

Mounting and setting dry insects

Preserving and storing insects in alcohol

2. Killing agents that can be used, include:

Ethyl acetate – best choice, but

- beetles may recover
- may make specimens hard
- fumes toxic, dissolves some plastics
- may cause greasing

Ammonia – best for Microlepidoptera?

- toxic to humans
- do not use for green moths as it changes colours

Laurel leaves – slow to kill, but good for relaxing

- pick in May when leaves are young
- toxic, contains cyanide

Deep freeze – very effective, overnight

- Seal specimens against drying
- After killing specimens may stiffen

Always label specimens inside tube / container!

3. Methods of dry mounting

Directly pinned – large specimens, long pins

Pinned on mount – small specimens, minutien pins

Carded – some beetles and some bugs

Pointed – very small specimens on card triangle

Reverse pinned – very small specimens, minutien pins

Setting - Lepidoptera

4. Which pin do I use?

Use stainless steel pins – others corrode!

Direct pinning: **continental size** (38mm long), sizes 2-5 depending on specimen size

For smaller specimens: **minutien pins**, size A-C, mount with size 3-4 continental pin

Lill pins are for setting

Cabinet points are for collection labelling

5. Where do I pin a specimen?

Direct pinning:

- Pin in centre of thorax, upright: Lepidoptera, Odonata
- Through right elytron or wing case: Coleoptera
- Through right side of top of thorax, come out in centre: large Diptera, Aculeata (see note below), Symphyta, Orthoptera
- Through right side of scutellum: large Hemiptera with large scutellum

Staging - pin with minuten pins on stages:

- small Aculeata through top of thorax (see note below)
- smaller Diptera through side of thorax, obliquely so that all characters can be seen at least on one side of thorax

Always pin specimens high on the pin, to leave space for forceps above and labels below specimen. The use of a pinning block is recommended.

Please note: For bees and wasps it is useful to open the mandibles (jaws) when preparing specimens. These insects should not be set in a flat plane, like Lepidoptera, but instead arranged so that the abdomen tilts down (to allow the propodeum/back of thorax to be seen), the legs are pulled down (to allow the side of the thorax to be seen), and for *Andrena* bees the head needs to be tilted away from the thorax (to allow the pronotal collar/front of thorax to be seen).

6. Wet storage of specimens

Use for delicate insects or early stages

Use 70-80% ethanol, if available, or surgical spirits (denatured alcohol or IMS)

The next best is Iso propyl alcohol

Can add glycerol (5%) to storage solution, this will prevent drying out, but recovery difficult

NEVER put Lepidoptera in liquid!

7. Preservation and mounting

Dry or wet preservation possible

See attached table for different insect groups:

Possible methods in table are:

- **D** = dry, **P** = pinned, **Pt** = pointed
- **C** = carded (glued to card)
- **W** = wet (in alcohol)
- **S** = slide mounted
- In **bold** = this method is mandatory

8. Recovery from alcohol

Can produce dry specimens from alcohol:

- Some harder specimens – Coleoptera, larger Hemiptera – can be pinned directly from alcohol
- Others, e.g. Diptera, delicate Hemiptera, Aculeata, are better as follows:
 - Pin specimen and dissect (if necessary)
 - Into 2-Ethoxyethanol overnight
 - Into Ethyl acetate for 1- 4 hours depending on size
 - Remove onto tissue and mop off excess
 - Blow from behind to open wings etc.

You can rehydrate specimens and put them into alcohol – special methods, not covered here

9. For a larger survey

Different groups need different techniques of sampling and preservation

Check with experts before survey and use the appropriate methods for collecting and preservation

10. SAFETY

- Remember, chemicals are dangerous!
- Read about the dangers of ethyl acetate, cyanide, ammonia etc. and be careful!
- Take care with minuten pins, they can be painful!

Methods of preservation of insects for 17 of the 24 native orders

Latin name	English name	Method of preservation
Collembola (non-insect)	Springtails	W → S
Arachnida (non-insect)	Spiders	W
Ephemeroptera	Mayflies	W
Odonata	Dragon- and Damselflies	D, P
Plecoptera	Stoneflies	W
Orthoptera	Grasshoppers, Crickets	D, P
Dermaptera	Earwigs	D, P
Blattodea	Roaches, Cockroaches	D, P
Psocoptera	Booklice	W → S
Hemiptera	Bugs, large	D, P
	Bugs, small	D, C or W
Hemiptera - Aphididae	Greenfly etc.	W → S
Hemiptera - Coccidae	Scale Insects	W → S
Thysanoptera	Thrips	W → S
Neuroptera	Lacewings	D, P
Coleoptera	Beetles	D, P or C
Mecoptera	Scorpion Flies	D, P
Siphonaptera	Fleas	W → S
Diptera	True Flies	D, P
Diptera - Cecidomyiidae	Gall midges	W → S
Diptera - Chironomidae	Non-biting Midges	W → S
Lepidoptera	Butterflies and Moths	D, P
Trichoptera	Caddisflies	W
Hymenoptera - Aculeata	Bees and Wasps	D, P
Hymenoptera - Formicidae	Ants	D, C, Pt or W
Hymenoptera - Parasitica	Parasitic Wasps	D, P, Pt or W

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