Microscopy
Where have your bees been?

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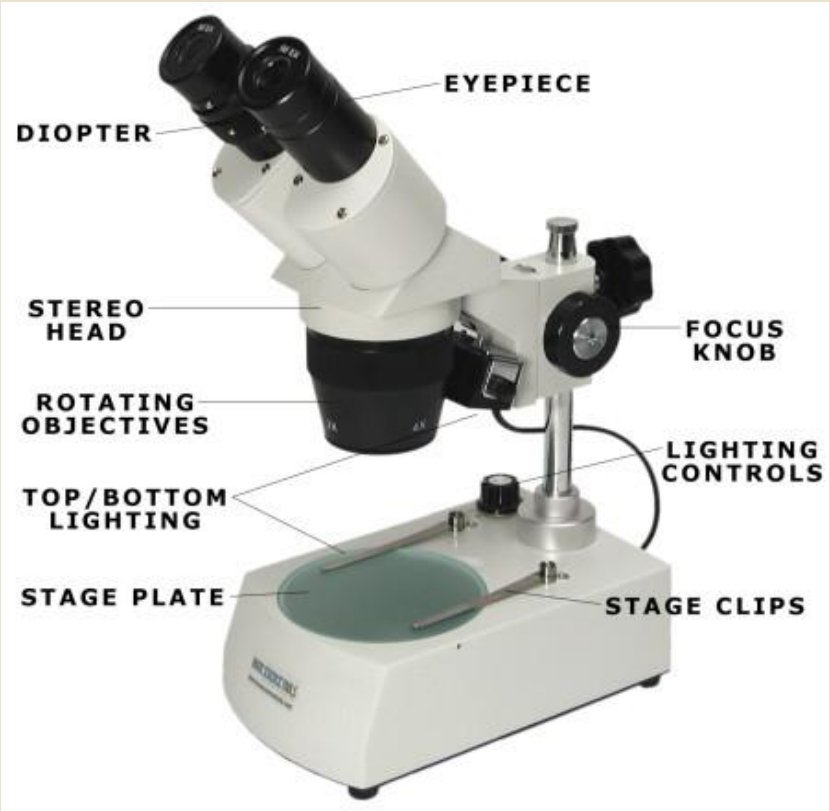
What can you do with a microscope?

- Identify where your bees are foraging
  - What are they bringing in –Pollen loads
- What to call your honey
  - What was the source of the nectar
- Are they suffering from any diseases

What type of Microscope

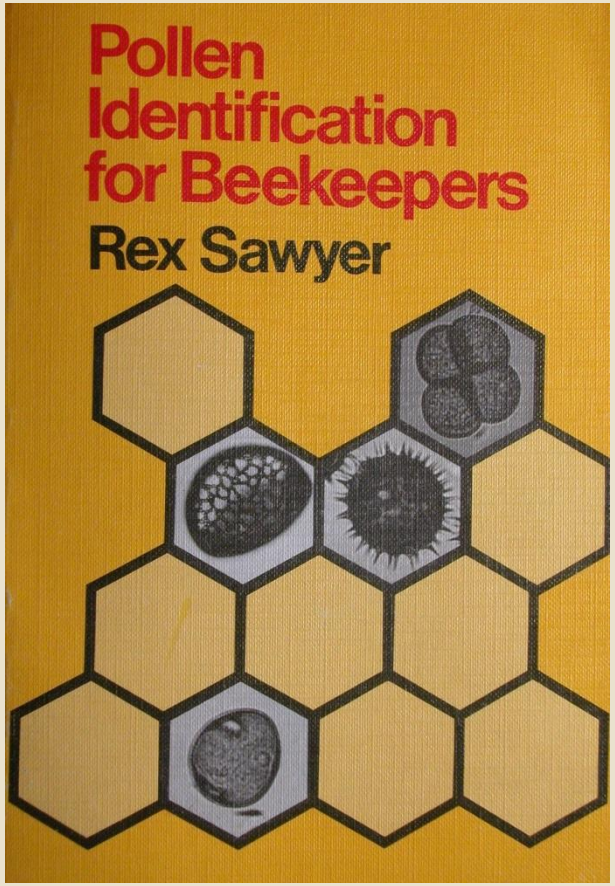


Microscopes

- Practice setting up
  - Setting up is crucial for both types
  - Create your own mnemonic
  - Do not assume that your last set up is in place once you move the microscope
- Learn the parts and their functions
  - Know when the set up is not correct
- Work with a “study buddy”
  - Explain things to each other as if teaching
  - Give critical feedback

Identification of Pollen

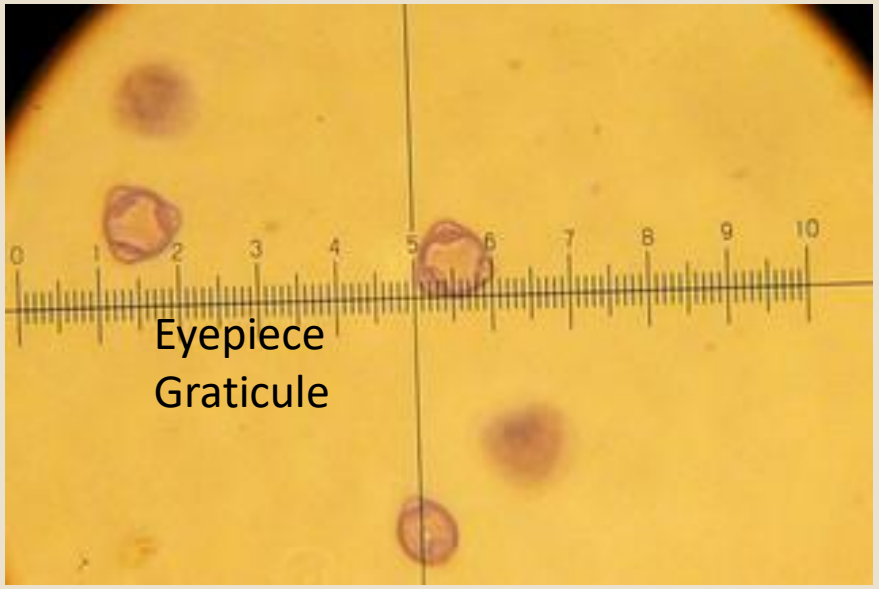
The reference!



Pollen grain features

1. Size
2. Shape
3. Aperture Number
4. Aperture Type
5. Surface (texture)
6. Exine, Section
7. Other structural feature
8. Pollen Colour (fresh bee load)

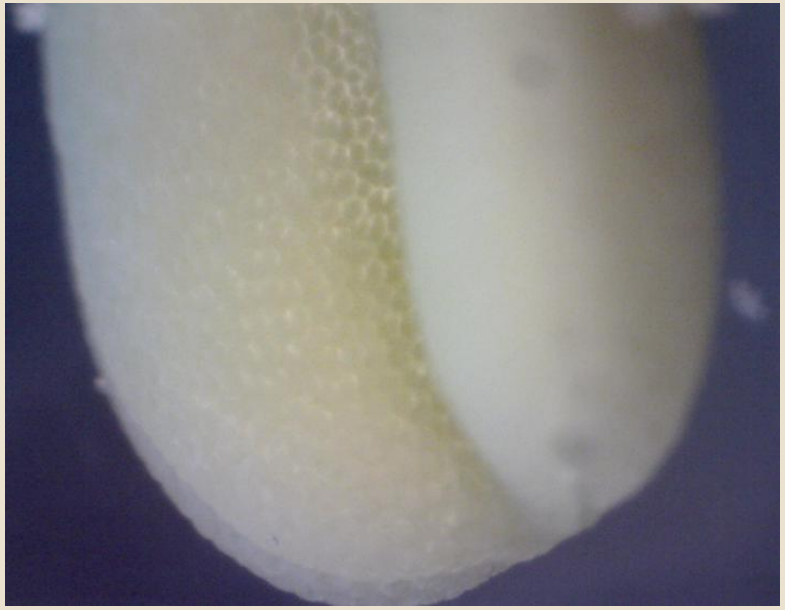
Use of an eyepiece graticule



- Calibrate eyepiece graticule for each objective using a stage micrometer
- Use eyepiece graticule to measure pollen
- May need to measure in different directions

Select ripe pollen

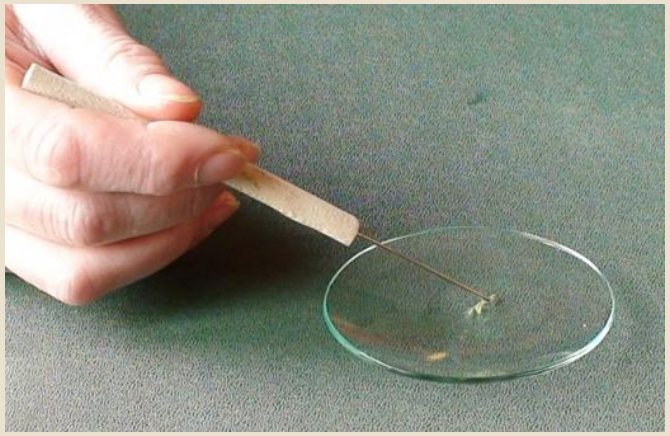
Unripe anther



Ripe anther

Prepare the Pollen

- Select ripe pollen
  - Cut from flower
  - Tap flower head into collector
- Most pollen is ‘waxy’
- Wash with propanol to
  - remove ‘wax’
  - Allow the stain to penetrate the pollen
- Remove unwanted debris



Preparation of Fuchsin Gel for staining pollen slides

Glycerine Jelly

7.0g gelatine

42.0ml cold water (tap water or distilled if tap water not potable)

50.0ml glycerine

0.5g carbolic acid (phenol) or 10 drops 80% solution

Add gelatine to cold water and stir and warm gently until the gelatine is dissolved. Then add the glycerine and carbolic acid.

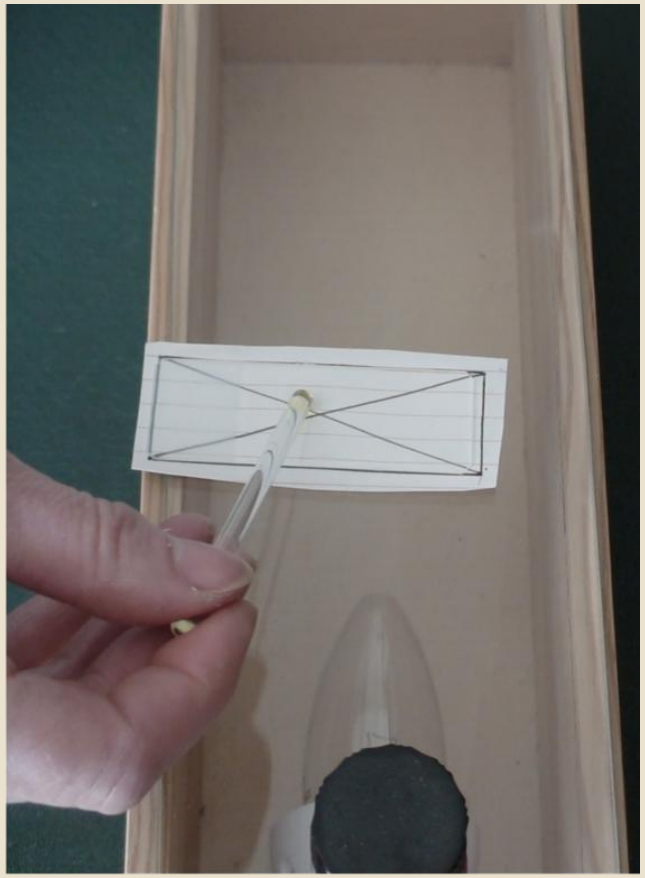
Stain

Dissolve 0.1g of Basic Fuchsin in 10ml of alcohol (propanol/ethanol/clear methylated spirit).

Take ⅓ of the jelly, add the stain carefully, drop by drop, until a clear pink or claret colour is produced. This portion should then be tested in use. Stain can then be added to other portions to give other densities as required.

Pollen onto the slide

- Clean glass rod to transfer pollen and alcohol
- Put some on a slide
- Warm it to evaporate the alcohol
- NB Slide on template to aid centralising of sample

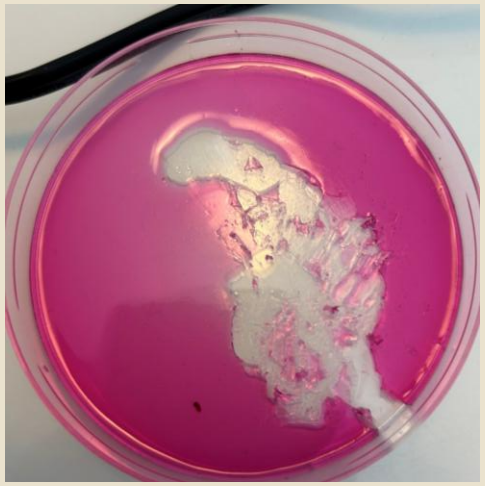


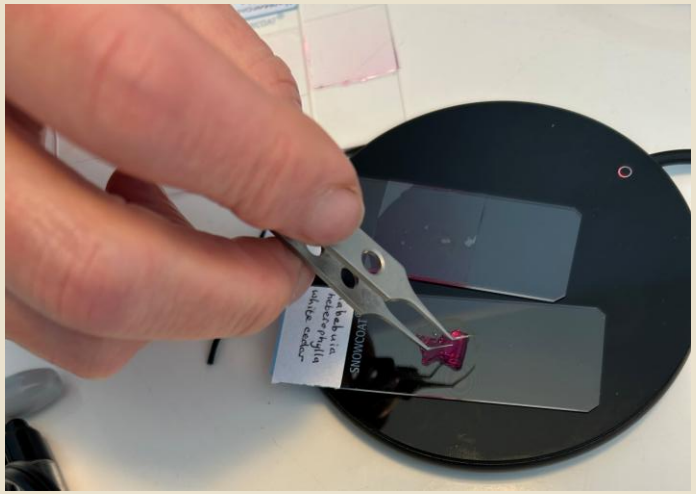
Adding the stain, Option 1

- Drop a droplet of warm fuschin stain onto the pollen after the alcohol has evaporated
- Keep over the warm for 10 mins to allow stain to penetrate pollen
- NB DO NOT touch the pollen with the glass rod used to transfer the stain (or the bottle of stain will be contaminated)

Adding the stain, Option 2

- Pour some liquid stain into a shallow dish with a cover
- Let the stain set
- Cut a small piece of stain and place on the slide over the pollen area





Add cover slip

- Lower slide onto slip
- Surface tension will pull slip to slide
- Turn it over and put it on slide warmer for 10 mins
- Remove and let cool
- Examine under microscope
- To preserve slide remove excess fuschin gel and seal edges of cover slip with clear nail varnish

Demo

Blackberry pollen grain

Acacia dealbata

Bay Hops (Ipomea pes-caprae)

Wild potato

Beach Spider Lily (Hymenocallis littoralis)

Yellow Nicker (Caesalpinia globuorum)

White lead tree (Leucaena leucocephala)

River tamarind

Making your own reference slides

- If you see your bees working a plant collect the flowers
- If they drop pollen loads: use these as a source of pollen
  - NOTE there may be more than one type of pollen in it
- Time of year and colour of pollen load can give you many of the indications you might need.
  - Many plants will have different colour of pollen load

- This is NOT an exact science but
  - IF YOU CAN IDENTIFY THE POLLEN IN THE HONEY YOU CAN NAME IT
  - E.G. MANGO HONEY

- Best references are Rex Sawyer
  - Pollen Identification for Beekeepers
  - Honey Identification