

## Rearing flies

The best time to rear flies is when the temperature is between 20-30°C. Really hot days are NOT suitable for flies.

### Equipment

- Substrate – baked sardines (not pickled) OR liver pate\*
- Small foam meat tray.
- Lunchbox – big enough for the meat tray to fit in with 5cm space on each side.
- Dry sand – enough for 4cm depth in the lunchbox.
- Tulle or net material – acts as mesh.
- Elastic band or the top cut out of the lunchbox – see below.

\**Chrysomya* (hairy maggots) attracted to fish.

\**Calliphora* (smooth maggots) attracted to liver.

### Method

- Set the meat trays with the substrate in a lunchbox on a 4cm bed of dry sand. Do NOT cover the trays.
- Use approximately 3 sardines per tray. From this size there will be an egg mass of 100-200 maggots.
- Place the lunchbox(s) outside.
- During summer leave the lunchbox outside between 24-48 hours. During cooler months leave for 5 days. Leave outside until maggots are visible.
- Bring the trays inside and cover with the net material – secure with an elastic band or the cut-out lid.
- The lunchboxes will get very smelly – as they do not require light they can be placed in places such as:
  - Roof tops (wind takes away a lot of smells)
  - Garden sheds
  - Fumehoods
  - Incubators
- It is important that the food source remains moist – **mist** with a spray bottle of water **daily**.
- Keep an eye on the food source – add extra food as necessary.
- Expect a mortality rate of approximately 10%.



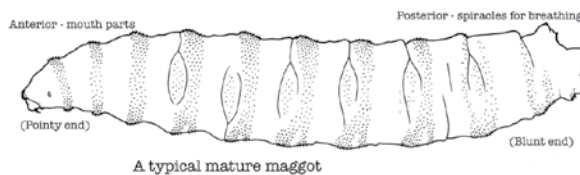
# FORENSIC ENTOMOLOGY

## Teacher Background Information

**Table 1:** As maggots develop through each larval stage they become bigger. The table lists the average size of fly life stages.

Life Stage	Size mm
Eggs	2-3
Larvae – 1 <sup>st</sup> stage	2-4
Larvae – 1 <sup>st</sup> stage	5-8
Larvae – 1 <sup>st</sup> stage	10-15
Pupae	6-10

A maggot has a pointy end (mouth parts) and a blunt end. The posterior segment of the blunt end contains spiracles that are used for breathing.



**Figure 2:** A diagram of a typical maggot. The pointy end is the anterior and has the mouthparts. The posterior segment is the blunt end and has the spiracles used for breathing.

*Diagram courtesy of Dr Ian Dadour, Centre for Forensic Science, UWA.*

**Table 2:** Each larval stage can be identified through the number of slits in each pair of spiracles found in the posterior segment of a maggot.

Larval stage	Slits within the spiracles in the posterior segment	Require
First instar	1 slit within each spiracle.	Microscope – difficult to see.
Second instar	2 slits within each spiracle	Microscope
Third instar	3 slits within each spiracle	Hand lens (x20) is often sufficient

Posterior segment showing a pair of spiracles.



Third instar maggot: 3 slits/spiracle

**Figure 3:** A diagram showing a cross-section of the posterior segment of a maggot. A pair of spiracles is shown, each with 3 slits indicating a third stage maggot.

*Diagram courtesy of Dr Ian Dadour, Centre for Forensic Science, UWA.*



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### Prepare maggots for microscopy

Maggots are killed in near-boiling water. An easy way to do this is to boil a kettle and then leave it for a couple of minutes. After 2 minutes, add the near-boiling water to a petri-dish containing the maggot(s).

Leave the maggot in the hot water for 10 seconds.

Using "soft" forceps, place the maggot in a 70% alcohol solution and leave for approximately 2 minutes.

The maggot is then ready for measurement and microscopy. (Leave the maggot in a petri dish while under the microscope.)

### Pupation

After approximately 3-5 days, the maggots will pupate. The maggots will migrate off the food source into the sand.

When all maggots have migrated you will be able to remove the meat tray with the food source from the lunchbox. This will be a biohazard so wear protective gloves and dispose of appropriately.

Keep the mesh on top of the lunchbox.

The pupa will take between 12-14 days to emerge as adults.

The flies will die in a couple of days after they have emerged as they have no food source.

After they have died, remove from the container and identify the species of fly through the classification key (provided) and pictures. (FSE08)

### Measurements

During the lifecycle of the flies, students should take the following measurements.

1. Daily maximum and minimum temperatures.
2. Length (mm) of maggots.
3. Note the date, time and number of changes from larvae development to adult emergence.

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