8 Practical 1

Investigating the stages of meiosis in the testis of a locust

Safety

Do not inhale the acetic orcein fumes.

Eye protection must be worn. Gloves should be worn when carrying out the dissection and handling the stain.

Apparatus and materials

- microscope
- coverslips
- glass rod
- scalpel (No. 3 handle with new No. 11 blade)
- cork mat
- filter paper
- slide hotplate
- prepared slide of locust testis squash
- surgical gloves

- slides
- hand lens
- fine forceps
- dissecting scissors
- pins
- acetic orcein stain
- freshly killed male locust, either a young adult or a 5th instar
- eyepiece with calibrated graticule
- eye protection

Introduction

The stages of meiosis can be observed in cells from the testis of a locust in what is known as a testis squash preparation.

In this practical, you will:

- dissect the testes from the insect
- stain the cells to show the chromosomes.

Procedure

1 You are provided with a freshly killed male locust. Wearing surgical gloves, use scissors to cut off the insect’s wings and legs and pin the body to a cork mat, with the dorsal surface upwards.

2 Use the scalpel and scissors to make a longitudinal cut down the length of the abdomen (Figure 8.1). Open the abdomen to expose the contents, and pin back the flaps of the body wall onto the cork mat.

Figure 8.1 Dissecting a locust
Using a hand lens, identify the testes. They lie above the gut, over the 5th and 6th abdominal segments. They are surrounded by yellow fat, and are a bunch of sausage-shaped tubules.

Remove two or three tubules from the fat and place them on a microscope slide. Gently squash the tubules with a glass rod to spread out their contents.

Add a few drops of acetic orcein stain to the tissue, and place a coverslip on top. Place a piece of filter paper on top of the slide and coverslip, and press down gently to spread out the cells.

Remove the filter paper and gently tap the coverslip with a blunt instrument such as the end of a scalpel handle. This helps to further flatten the testis cells and spread out the chromosomes.

Warm the slide on a hotplate for 30 seconds. This helps to intensify the stain.

Locate the testis cells under the low-power objective of the microscope. Use the high-power objective to identify cells undergoing meiosis. If you have difficulty identifying any suitable cells, you can use a permanent slide of a locust testis squash instead.

Make drawings of any stages of meiosis that you can see. Label and annotate your drawings (see Figure 8.3 on pages 110–111 of Biology 2). Use a calibrated eyepiece graticule to measure your drawings, and add a scale bar to your drawing.