

## LABORATORY EXERCISE 17: Histology of the Alimentary Tract

In the following exercise, you are to examine under the compound microscope prepared slides illustrating various parts of the digestive system of insects to show their fine-structure. View the slide under low power, then carefully (!) shift to high power. Slides to be seen are the following:

### Fore Gut:

1. Longitudinal section of the crop and gizzard of a cockroach or grasshopper. Note the loosely arranged muscles, epithelium and tracheae of the crop. Note also the gizzard with prominent cuticular “teeth,” used for grinding food particles.
2. Cross-section of crop of *Periplaneta americana* or of a grasshopper. Make a drawing (**Drawing #30**) of a small part of the section and label intima, epithelium, and longitudinal and circular muscles (see Gillott, fig. 16.2).
3. Cross-section of the gizzard of a cricket, *Acheta domestica* or *Gryllus* sp. Note the nature of the internal armature. Make a drawing (**Drawing #31**) of a small part of the section and label the tissues as above (see Gillott, fig. 16.2).
4. Longitudinal section of the gizzard of a cricket, *Acheta domestica*. Note longitudinal extent of the proventriculus and thickening and thinning of the intima. Muscles should be thick.

### Mid Gut:

1. Cross-section of the midgut or of a midgut caecum of *Periplaneta americana* (see Gillott, figures 16.3 and 16.4). Compare with foregut sections above. Draw (**Drawing #32**) part of the section and label the muscle layers, glandular epithelium, striated border, and peritrophic membrane(s) (if present -- obviously, this won't be seen in the caeca).
2. Longitudinal section of midgut of a cockroach or grasshopper (same slides as in foregut #1). Compare with one another. Note peritrophic membrane(s), nests of germinal epithelium, and, in the roach especially, the heavy (usually) infestation of protozoans (*Gregarina* spp.) between epithelium and peritrophic membrane.

### Hind Gut:

1. Longitudinal and cross-section of the hind gut of *Periplaneta* or of a grasshopper (can use same slides as foregut #1 for latter); compare histology with that of foregut, particularly with regard to the arrangement of longitudinal and circular muscles and extent of intima. Note also ragged remains of peritrophic membrane enveloping solid wastes (see Gillott, fig. 16.7).
2. Whole mount of hindgut or **rectal gill** of a dragonfly nymph (Odonata: Anisoptera). Note respiratory specializations.