Jonathan Quang 2/7/15

Lab #1 Structures of the Grasshopper SLS44-09

Pre-Lab #1: How are the Structures of the Grasshopper Adapted for their Functions

1. The chitinous exoskeleton is both an advantage and a disadvantage for the grasshopper. The advantages a chitinous exoskeleton offers over the endoskeletons of mammals is that the chitinous exoskeleton is more protective over internal tissue than the skin of a mammal. It also offers more leverage when pulled by muscles in comparison to a mammal. However, several disadvantages also result from a chitinous exoskeleton. As size of the exoskeleton increases, it becomes even more heavier than if the endoskeleton of a mammal were to increase. In addition, once the exoskeleton is formed, it cannot grow. The grasshopper must go through molting in order to grow. During this time, the grasshopper is vulnerable. The endoskeleton of a mammal grows fairly smoothly in comparison.

2. The legs of a grasshopper are adapted the environment it lives in as well as its eating methods. The grasshopper typically lives in areas of abundant vegetation. The large and strong hind legs of a grasshopper are well suited for jumping around to find food as well as escaping from predators. The front legs of a grasshopper are smaller and are positioned to assist the grasshopper in manipulating food toward the mouth.

3. The mouth parts of a grasshopper work together to ingest food. The grasshopper uses its mandibles to break pieces of vegetation into smaller chunks. The four small antennae like projections around the mouth are called the palpi. Each palpus assists in manipulating food toward the mouth as well.

4. For a grasshopper, molting begins with climbing onto a leaf or a branch. Then, the grasshopper slides out of it its old exoskeleton. The grasshopper has a new, soft exoskeleton exposed to its environment. Finally, it takes in air while its exoskeleton hardens. This is an important process for grasshoppers because grasshoppers cannot grow if their outside shell remains hard. In addition, the wings of a grasshopper do not reach their full size until the last molt.

5. Ganglia: A dense group of nerve cells which may receive information and direct parts of the body. Ganglia belong to the nervous system.  
Malpighian tubules: Narrow tubes in the hindgut of a grasshopper that may expel waste. malpighian tubules belong to the excretory system.  
Gastric caecae: Sac-like structures that contain gastric juices that are involved in the digestion of food in the mid gut. These structures belong to the digestive system.

Spiracle: Small holes in an insect that allow for air to enter and leave the body. These structures belong to the respiratory system.  
Ovipositor: An organ used by some insects to lay eggs. This organ belongs to the reproductive system.

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