



Molting: The Changing of the Guard

For the most part, a new outer layer is no big deal for vertebrates. Mammals shed and grow new hair. Birds lose and grow new feathers. Reptiles regularly shed the outer layer of skin. Fish scales grow as the fish grows. Some invertebrates, such as clams and snails, have a shell that grows as they grow, so a new outer layer is no big deal for them, either.

Other animals don't have it so easy. Some animals must literally squeeze out of their outer layer before they can grow. For animals with an exoskeleton, the process of getting a new outer layer is a difficult, bizarre process and takes many forms. Exoskeletons are hard, inflexible, and jointed. In order for creatures with an exoskeleton to grow, the exoskeleton must break open and the creature inside must get out. The animals are able to break shells from the inside using hydraulic pressure. The exoskeleton of insects breaks longitudinally down the back side of the thorax. The insects exit the shell by pushing up and out; thorax first, then the head, and the abdomen last. Crabs break their shells side to side behind the carapace and the animal must back out. Spiders and their marine cousins, horseshoe crabs, break their exoskeletons at the front edge of the cephalothorax and exit from the front.

When an animal first leaves its exoskeleton, it is soft and very vulnerable. Even the pinchers of crabs, when soft, are of no use. People take advantage of this when they eat "soft-shell" crabs; just boiling and then eating them whole, shell included. After molting, most creatures find a protected hiding place and wait until their new exoskeleton hardens.



Dragonfly nymph molt. Note the gap between the wing buds.
photo by S. Petersen



Green crab starting to molt. Note the back of the shell is lifting up.
photo by Dr. Gabriela Bradt, New Hampshire Sea Grant.



Horseshoe crab molt. Note the gap at the front edge.
photo from www.gulfspecimen.org

People often mistake molted exoskeletons for dead animals. The easiest way to tell the difference is to hold the specimen. If it smells, it is dead. If it weighs what

might be expected of an animal that size, it is dead. If it is lightweight and odorless, it is a molt. Once it is determined to be a molt, the exit point is usually easy to observe.

Molts are easy to find. Aquatic insect molts are often found on vertical surfaces next to rivers and ponds. Molts of saltwater animals can often be found on shore near the high tide mark or floating on top of the water. The next time you are near the river or Great Bay, see if you can find some of these old invertebrate suits.