By Ginny Neil

SURVIVAL OF THE SMALLEST

Those smallest creatures walking, crawling, and flying around on the earth have a good chance of becoming a bird's breakfast. What can they do to protect themselves? Lots of insects were created with built-in defense systems to keep them safe in a world full of hungry predators.

Consider the eastern harvestman. You probably call it a granddaddy longlegs. Harvestmen often hide in dark spaces to avoid being eaten. If a predator, like a lizard, does find one and snatches one of its very long legs, this arachnid has a unique form of escape. It sheds the leg and walks away, leaving the puzzled lizard behind. The harvestman will live to see another day, but it will never regrow its missing limb.

Another insect that can let go of a leg is the stick insect. These twig-shaped bugs have a special muscle that was designed to break off the leg at a joint. Unlike the harvestmen, stick insects can regrow the missing leg the next time they molt, or shed their skins. Stick insects can also protect themselves by playing dead. If a predator approaches, these bug freeze and drop to the ground. Most predators don't eat dead things, so will leave to search for better food.

Some bugs are dressed like the knights of old. The ironclad beetle wears a strong suit of armor. It's so tough, that it can even survive being stepped on by a large animal. The armor makes these bugs too tough and crunchy to eat, so most predators leave them alone. Another insect with a tough body suit is the roly poly. Some people call them pill bugs. Like miniature armadillos, they curl up and hide inside their scaly shells when they are threatened. This keeps predators from making a meal out of the roly poly's soft undersides.

Invisibility is another neat trick that bugs use to stay safe. Some bugs camouflage themselves and disappear into their surroundings. For example, katydids are called leaf bugs because they mimic green leaves on trees. Spanworms, which you may know as inchworms, resemble the twigs of the trees they live on. The spittle bug makes a nest of bubbles. The bubbles look like spit, and the spittle bug hides underneath, while the dry leaf butterfly hides in plain sight by looking like a dead leaf. The beautiful wood nymph moth also hides in plain sight. When it lands, this moth folds its wings and looks like a pile of bird droppings. No predator wants to eat that!

Not all bugs are peaceful. Take the *Neocapritermes taracua* termites for example. The old members of the colony can spray a toxic chemical at their attackers. Bombardier beetles add heat to their weaponry. They mix an irritating combination of chemicals in their backsides. The mixing heats the chemicals almost to the boiling point. This builds up pressure that helps to launch the chemicals at hungry predators. Bees, wasps, and scorpions carry stingers, and some caterpillars are covered with irritating hairs that burn or leave a rash on a predator.

So when you're surprised by a leaf moving on a branch, or you turn over a log and find hundreds of little round gray balls, you'll know. You've just witnessed the small wonders of God's insect protection design at work.