On the Lookout for Imposters!

An unfortunate feature of the modern electronically connected world is the digital imposter who masquerades as part of a legitimate company to lure unsuspecting users into disclosing sensitive identification and/or financial information. Of course, we are all aware that it is necessary to be on guard for these attempts while emailing, texting and surfing the Internet. But did you know that imposters lurk in the natural world as well? Fortunately, plant and animal imposters are not attempting to fool and exploit humans. Instead, nonhuman imposters are simply mimicking the coloration, physical characteristics and/or behavior of other plants, animals and insects in order to eat or avoid being eaten and in the case of some desert wildflowers, to attract pollinators with as little effort as possible.

In our desert parks, gopher snakes (*Pituophis melanoleucus*), exist alongside their more dangerous relatives, the Mojave rattlesnake. Both snakes can give a painful bite, but the gopher snake does not dispense venom with its bite. It obtains its meals by constriction, not through the use of poisonous venom. However, when agitated, gopher snakes will coil like a rattlesnake and flatten their heads to appear more like a venomous snake. They also vibrate their tail and produce an audible hiss when threatened. All of these behaviors mimic the more dangerous rattler in the hope that a threatening predator will look for other prey. The coloration of this rattlesnake imposter also mimics its deadlier cousin; both have splotchy dark markings on their backs, yellow or brownish coloration and large heads.

The caterpillar of the white-lined sphinx moth *(Hiles Lineata),* often called a horn worm, is large and plump and must often travel over open ground to find its favorite food, brown-eyed primrose. To avoid looking like an easy meal for a predator, it sports an appendage from its rump, which is often strikingly orange. This “horn” mimics the stinger found on many other insects and helps to persuade predators to move on to what may be an easier target. Many caterpillars have colorful “eye spots” that mimic the real eyes of more threatening animals and are meant to intimidate predators. Numerous species of hawk moths and swallow tail butterflies have this feature.

Like the painted lady *(Vanessa cardui),* the common butterfly of the Mojave Desert, many butterflies have evolved to closely resemble the larger and more famous monarch butterfly (*Danaus plexippus);* there are at least 7 species of butterflies that resemble the monarch. Scientist believe that this evolutionary mimicry came about due to the diet of the monarch caterpillars. Monarch butterflies lay their eggs on just one type of plant, milkweed (genus Asclepias).

Milkweed contains toxins in its milky sap. The sap contains toxins called cardiac glycosides or cardenolides, which are toxic to animals if consumed in large quantities. However, most animals won’t eat it because it simply does not taste good. What it does do is provide food for the monarch caterpillars and subsequently a protective toxin for the monarch butterfly when the caterpillar transforms. Monarch butterflies become toxic to predators by storing this toxin in their bodies. This makes monarchs very distasteful or unpleasant to predators. Studies have shown that birds can learn to avoid preying on monarchs after exposure to this toxin and can then transfer this avoidance behavior to other butterflies that closely resemble monarchs including the desert painted lady.

While flower watching in the desert it is always exciting to find the luminous sand blazing star (*Mentzelia involucrate)*.The pale yellow blazing star has a floral mimic, the ghost flower (*Mohavea confertiflora*) which has evolved to closely resemble it. Amazingly the ghost flower, one of the cleverer plant tricksters, is a bee imposter as well! Recently, in early February, I found both flowers within several yards of each other in Box Canyon south of Joshua Tree National Park. I first spotted a blazing star and then its plant imposter, the ghost flower. Why is it advantageous for one to resemble the other? The mimic ghost flower saves energy by not producing any nectar to attract pollinators. Rather, it relies on its resemblance to the sand blazing star to fool insects into visiting its flower, where they receive no reward for their pollinating efforts. Both are pollinated mainly by the Xeralictus bee. The blazing star attracts the female bee by producing sweet nectar. The female bee uses the nectar to take back to their nest to feed their young. In

the process, they enable pollination as they transfer pollen from flower to flower. The ghost flower attracts the male Xeralictus bee but since it has no nectar to lure the bee to its bloom how does this happen? Quoting the scientist and artist Margaret Gallagher:

> *The Ghost Flower - it not only mimics the Blazing Star, it also has red spots on its petals which are thought to actually mimic the appearance of a female Xeralictus bee visiting the flower. Male bees see this flower and approach, hoping to mate! But instead they just bumble around, pick up some pollen (there's no nectar for them to eat, and they don't even want it anyway), and continue on their way unsatisfied, until they are tricked into visiting another Ghost Flower, and pollination occurs. In this way, the Ghost Flower takes advantage of the male Xeralictus bees, capitalizing off the symbiotic pollination relationship of the female bee with the Blazing Star.*

Look for these plant and animal imposters – and in the case of snakes, please look carefully – as you amble through our ceaselessly fascinating desert public lands! For photos and links to more information, visit www.prmdia.org/news/newsletters