

## Some Truly Amazing Things About Mother Nature

Mother Nature is so full of wonder and really amazing things that most of the time we just take them for granted and don't give them any real thought. Here are just a few of the many things I marvel at in the natural world around me.

In the insect world, there are parasitic wasps as small as 0.025 mm or 0.01 inches, smaller than the period at the end of this sentence. These insects have, like all other insects, three body parts (head, thorax, abdomen) and six legs and, like most insects, two pair of wings. And they have a nervous system that can coordinate the movement of all six legs to walk and both pairs of wings to fly, and eyes and whatever other senses they have to find their host (eggs of caterpillars) on which to lay their eggs! Makes our cell phones seem big and bulky doesn't it?

In our backyard, we have a bird feeder that hangs a little over three and a half feet off the ground. We also have Eastern Fox squirrels, whose body length is about 12 inches (not including the tail) that can jump flat-footed from the ground to grab hold of the feeder, over three and one-half times their body length. That is the equivalent of a six foot person jumping to touch something about 21 feet high! And of course, the speed with which they can climb a 30 foot tree is also amazing.

I think everyone who has thought about it is in awe of a hummingbird which weighs less than a nickel and beats its wings at around 60 times per second that can migrate thousands of miles every year and remember where your feeder was last year.

But even more amazing than the hummingbird is the life cycle of the monarch butterfly. In the spring as the monarch butterflies begin their northward migration, overwintering females lay eggs here in Texas and then die. The eggs then hatch into caterpillars which eventually turn into new butterflies. And the process is repeated several times as they migrate to the northern US and Canada.

But the monarchs that hatch in late summer in the north do not lay eggs, but instead migrate back through Texas to the same place their ancestors wintered in the last winter. There they overwinter in a small mountainous region in Mexico in pine trees before migrating back to Texas in the spring to lay eggs and die and the cycle repeats itself. To be clear, the parents, grandparents and great grandparents, etc. of the butterflies that made the fall migration did not migrate or live more than a month or so and clearly had never been to the wintering ground. It is all in their DNA.

There is a saying, "You can count the seeds in an apple, but you can't count the apples in a seed", and an older one, "Mighty oaks from little acorns grow". Seeds are, truly, amazing things. Humans have been planting, and eating, seeds for hundreds, or in

some cases thousands, of years (corn, wheat, beans, nuts). They are such common things, we don't even think about it anymore.

For a seed to form, the plant egg must be pollinated and matured while still a part of the parent plant. For a plant to germinate, that seed must be distributed to a place on or in the ground where it can lie undisturbed until conditions are right for it to germinate and make a new plant. Many, many things can go wrong in every step of that process, so that usually only a very tiny minority of the seeds produced ever actually germinate and make a new plant.

First, if a fertile seed is to germinate it must be in the correct environment of moisture, temperature, sunlight, and soil for the proper length of time, undisturbed. Then, at the right set of those conditions, the DNA in the seed begins to produce what will become roots and leaves, using only the tiny amount of material in the seed and covering and the energy stored in them. It can't begin to carry out photosynthesis to actually "grow" until it has leaves with chlorophyll.

And that DNA contained in that seed has the instructions for determining the characteristics of the mature plant, its size and shape, how and when to make leaves, to bloom, the shape of the leaves, when to drop leaves in the fall and grow new ones in the spring, etc. Everything about that plant, even a hundred year old giant sequoia, was determined by the DNA in that seed!

Until next time...

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