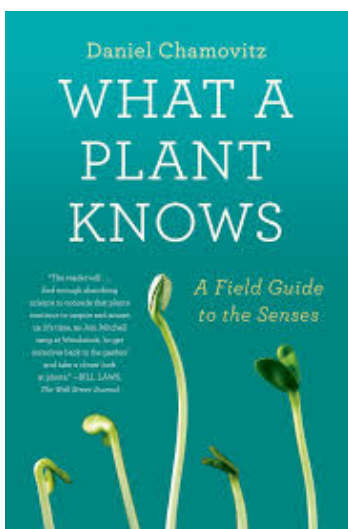


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# Book Review – What a Plant Knows: A Field Guide to the Senses – Evergreen Audubon

4-5 minutes

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According to Daniel Chamovitz's research, plants are more like animals than we've been led to believe. In *What a Plant Knows*, Chamovitz, director of the Manna Center for Plant Biosciences at Tel Aviv University, makes a strong scientific case that plants do indeed see, smell, feel, remember, and know where they are. The only sense that he finds insufficient evidence to support is hearing, but he's hopeful. He has come to realize that genetic differences between plants and animals are not as significant as he once believed.

Plants can **see** us. They know when we come near or if we're

wearing a red or a blue shirt. They measure the amount of light they take in, determining the best time to begin flowering. They know when to open and close their leaves. If we change their light-dark cycle, they go through jet lag.

Plants can **smell**. They know when their fruit is ripe or if a neighbor is being attacked by a bug. One noxious weed can smell a nearby tomato plant, using the scent to siphon off sugars from its stem. Damaged plants send off odors to warn neighboring plants that attackers are near.

Plants know when something **touches** them. A Venus flytrap knows exactly when it is being touched by the right size fly. The fly must touch two hairs in the trap within exactly 20 seconds for the trap to close. Some plant leaves stop growing if they are touched too often. Others react then they're sprayed with water. When a researcher burned a tomato leaf, she detected an electrical signal in the stem a distance from the wounded leaf. The tomato responded to the attack by warning its other leaves about the danger.

Despite referencing a fair number of scientific experiments, Chamovitz concludes that nothing indicates that plants can **hear**, despite popular claims that plants love classical music. Darwin monitored his plants response to his bassoon playing, with no success. Most other experiments claiming success have not be replicated when conducted with scientific controls.

Plants are rooted in place; they can't run away to escape threats, but they know **where they are**. They know where up is, toward the light, and they can send roots down, even from high up in trees. A plant turned upside down will reorient itself. This ability is

a sixth sense, called *proprioception*.

Using proprioception, we know where the parts of our body are without looking at them. The semicircular canals in our inner ears tell us if we are upright or upside down. The proprioceptive receptors through our body tell us where our limbs are.

Plant roots respond to gravity, even to simulated gravity imposed through a scientific experiment. Darwin discovered that if a root lost 0.5 mm of its tip, it could no longer respond to gravity.

However, the root tip passes information to the rest of the plant even after it is cut. Plant stems, in contrast, know which direction is up.

Experiments done on the space station showed that plants do an oscillating dance throughout the day, influenced by gravity. For plants in the space station, lacking gravity, the spiral patterns slow down but don't disappear. Plants have a built-in cyclical movement, strengthened by gravity.

Finally we learn that plants **remember**. If you cut a growing bud from a plant, the plant remembers where it was cut and responds by growing in the injured direction. We can plant “winter” wheat in the spring simply by freezing the seeds, convincing the wheat that it has been through a winter. Young plants remember if their parents were stressed. A plant's procedural memory helps them know what to do to be successful.

In a brief 140 pages, Chamovitz demonstrates that plants are truly **aware**. We share an evolutionary biology even if the mechanisms each has evolved followed different paths.

If you have children who enjoy setting up science experiments for

the school science fair, *What a Plant Knows*, is a terrific resource. The experiments are explained clearly, with sufficient detail to suggest any number of interesting experiments the children could try. Perhaps they could add to our understanding of how plants interact with their environments.

Scientific American Press, 2012