Plants Have Nerves Says Cornell Biologist

What do plants and man have in common? A Cornell University biologist has determined that certain plant cells act much like human nerve cells in transmitting nerve-like signals from one point to another.

Stephen E. Williams has found that the sundew plant, a carnivorous plant which grows in bogs and other swampy spots, actually "feels" its prey before making the catch. When an insect is caught, it often rubs the tips of neighboring tentacles causing the tentacles to bend over and hold the prey against the leaf. Insects are then digested by enzymes, providing nourishment to the plant.

The question is, how does the base of the hairlike tentacle "know" when to bend over and pin the prey against the leaf if all that the insect touches is the tentacle tip? That question also puzzled Charles Darwin about 100 years ago. Williams' discovery of the nerve-like activity satisfies the question that raised Darwin's curiosity.

Williams explains that the tentacle tip is made of layers of highly sensitive cells that are capable of converting a mechanical or physical stimulus, such as touching, into electrical impulses much like nerve signals.

The message travels down to the base of the tentacle when the tip is touched, much the same way human nerve cells relay signals throughout the body in the form of electrical pulses.

Using very small electrodes, the plant physiologist was able to measure how fast the "nerve" signal travels through these cells. He found that the signal in the sundew travels as much as 10,000 times slower than in animal systems.

"This is the major difference between the nerve-like processes of sundew cells and those of nerve cells in animals," he notes.

It also was found that the direction of the signal can be reversed. When the base of the tentacle is stimulated artificially with an electric shock, the signal will travel toward the tip.

Discussing implications of his findings, Williams says that study of this group of plants could shed much light on the evolution of sense organs.

"It is remarkable that these plants are totally unrelated to animals and yet they have developed very similar sense organs completely independently," he notes.

From a practical standpoint, his work could serve as a valuable research tool in exploring the possibility of such a phenomenon in other types of plants — a research other types of plants.

Does the sundew, Venus'-flytrap, pitcher plants, and other types of carnivorous plants depend on meat diets for their survival?

"Not necessarily," Williams says.

In another Cornell study conducted some years ago, in the same laboratory by concidence, it was found that the sundew survived as long as eight years in complete isolation without receiving a single bite of "meat."

"But, with insect diet supplements, the plant usually does better," Williams points out. "It makes its own food by means of photosynthesis, but insects apparently furnish vital mineral nutrients."

In his "Insectivorous Plants" published in 1875, Darwin reported that any tiny piece of meat or egg white was handled by the sundew in the same way it digested insects.

"This is still true, but home gardeners tend to feed the plant too much," Williams says.

Like all of us, plants need a proper diet.