Covering Environments—The CEAC Monthly Seminars

MARTHA HAWES, PhD

Professor, Soil/Water and Environmental Science (SWES) & Plant Sciences

Extracellular DNA Traps in Plant and Animal Cells: A Dynamic Interface Between Disease and Health

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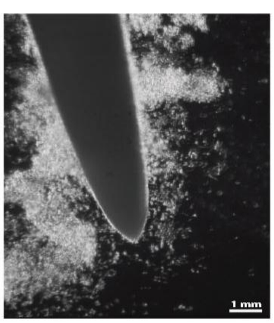
In introductory biology courses, the question often arises: are plants the same or different from animals? A plethora of characteristics is then offered to demonstrate that indeed plants and animals are *totally* different. After all, they are classified in different kingdoms, aren't they? Now comes Professor Martha Hawes and proclaims, based on her pioneering research: 'Not so Fast!!!' Yes, there are obvious differences between these kingdoms, but there are also profound similarities. One of those is the ability of both plants and animals to identify disease-carrying pathogens and importantly to combat them resulting in healthy, thriving organisms. So, Hawes and her team wondered: do plants have their own mechanisms for protecting themselves from their own pathogens analogous to animals' immune systems? To answer this question, she reasoned that since a major route of attack for plant pathogen (bacteria, viruses, fungi) is likely to be at the soil—root interface, that would be a logical place where plants do battle against their pathogens.

So, over the past three decades, Hawes has been studying the structure-function relationships of roots to determine whether a defense mechanism exists at this interface. Indeed, Dr. Hawes' focused studies have yielded tremendously important discoveries about a specific element of plant roots, namely *root border cells,* for which function has eluded plant scientists until recently. Martha Hawes' ingenuity, creativity and perseverance led her and her team to focus on these *border cells,* culminating in showing that these cells sequester plant pathogens and then by detaching themselves from the growing root tips leave the latter free of disease and predators. These discoveries have thus defined a novel, incredibly important mechanisms for how plants fight off soil-borne pathogens greatly facilitating healthy plant growth. In this seminar, Dr Hawes will describe this research, including recent advances, and point to future directions which, by tweaking the function of border cells, may lead to significantly increased food production.



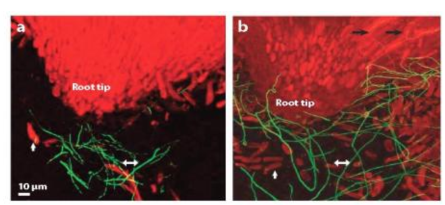


Figure 6

Early changes in *Nectria haematococca* (*Fusarium solani* f. sp. *pisi*; *green*)-root tip (*red*) interactions in response to DNase I. (*a*) At 36 h after inoculation, fungal hyphae (*double white arrow*) are truncated and fragmented, and remain separate from root tips, among detached border cells (*small white arrow*). (*b*) In the presence of DNase I, hyphae proliferate and penetrate the root tip (*black arrows*) despite increased border cell production (50). Reproduced with permission from **http://www.plantphysiol.org**, Copyright American Society of Plant Biologists.

*Seminars are held @ CEAC, 1951 E Roger Rd (corner of Campbell & Roger). A get Acquainted, networking session starts at 3:45p and includes light refreshments. Parking is free and available on the CEAC grounds.