A NEW TECHNOLOGY TO OBSERVE MITES, CONFOCAL LASER SCANNING MICROSCOPY

G.R. Bauchan[1], S. Bolton[2] & R. Ochoa[3]

[1]USDA-ARS, Electron and Confocal Microscopy Unit, Beltsville, Maryland, USA; [2]The Ohio State University, Department of Evolution, Ecology and Organismal Biology, Acarology Laboratory, Columbus, Ohio USA; [3]USDA-ARS, Systematic Entomology Laboratory, Beltsville, Maryland, USA.

Confocal Laser Scanning Microscopy (CLSM) is a new technology being used to study mites. CLSM creates sharp images of fluorescent specimens by excluding almost all of the light from the specimen that is not at the microscope's focal plane. The image has reduced stray light and better contrast than a conventional microscope and represents a single thin cross-section of the specimen. These cross-sections optically dissect the mite so that even internal structures can be observed which can be assembled together as a Z-stack of images to develop a 3D image that can be turned and twisted for observation using computer software. It was only recently discovered that the cuticle of the exoskeletons and internal structures of mites auto-fluorescence which requires no fluorescent staining or labeling through the use of CLSM. We use a Zeiss 710 CLSM system which has 4 lasers, 6 objectives lenses (10x, 20x, 25x, 40x, 63x and 100x), photo-multiplier tube detectors, and computer software to compile and analyze the imaging data. The best choice for studying mites is fluorescent light in the blue range (405nm); however, green (488nm) and sometimes red (561nm) light also discern different structures of the mite. CLSM has been found to be helpful in morphological studies of external structures (integument, setae, eyes, etc.) and internal structures (mouth parts, reproductive organs, etc.) as well as feeding behavior, reproductive behavior and habitués studies. CLSM represents an exciting new technology which can be used to observe as yet unseen world of mites.