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THREE-DIMENSIONAL VIEWS ON LIFE: LASER CONFOCAL SCANNING MICROSCOPIC EXAMINATION ON FRUITING MORPHOGENESIS OF *COPRINUS CINEREUS* AND *PLEUROTUS PULMONARIUS*

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We are developing the use of laser confocal microscopy to establish an accurate data set describing the geometrical arrangement of the hyphal components of fungal tissues. This cannot be done using conventional microscopy because z-axis (vertical) dimensions and internal branch angles cannot be measured. After a range of trials, involving conventional serial sectioning for both light and electron microscopes, we obtained data from serial ***optical*** sections using samples of fungal tissue labelled with fluorescein isothiocyanate labelled lectin to reveal the N-acetyl-beta-D-glucosamine/glucosaminyl groups of hyphal walls. Three-dimensional reconstruction was achieved utilising a standard desktop personal computer, with AVS/Express and Confocal Assistant software. The confocal images are readily converted to red/green anaglyphs (using Confocal Assistant) which provide an easily realised three-dimensional visual sensation. However, the intention is to produce three-dimensional visualisations (using AVS/Express). These are fairly primitive at the moment (though they can be rotated for viewing from various angles), but they hold the promise of development to full 3-D visualisations which can be inspected 'from within' and used to extract geometrical measurements. A number of factors still need to be addressed to make this a routinely useful procedure. Such visualisations will be the source of the accurate 3-D observational data needed to enable tissue structure to be mathematically described. Parameters extracted from the visualisations will enable computer modelling to be extended into 3 spatial dimensions. The aim is a computer model able to simulate the hyphal architecture of mushroom tissues that can be explored to catalogue the structural effects of changes in its parameters. Study of these simulations will reveal morphogenetically important parameters and define experiments to improve knowledge of *in vivo* morphogenetic control very considerably.