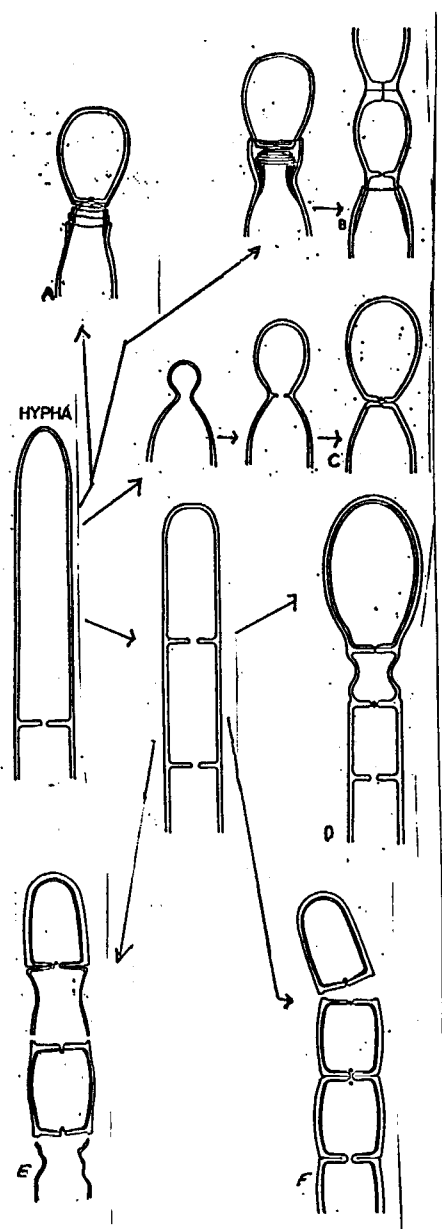


NAME _____

EXAM II
March 21, 1997
MIC 321

Directions: All explanations, definitions, and descriptions should be presented in good English. This means complete sentences should be used except when lists or fill-in-the-blanks are required. Spelling of mycological terms should be accurate. Slight misspellings may be overlooked, but major misspellings will result in wrong answers.

1. (12 pts; 2 pts each) The identification of Hyphomycetes to form-genus is often most efficiently made by observations of conidium ontogeny (the morphological mechanism used by the fungus to produce its conidia). In the blanks provided identify the ontogenetic methods indicated by each diagram and identified by the letters A through F.



A. _____

B. _____

C. _____

D. _____

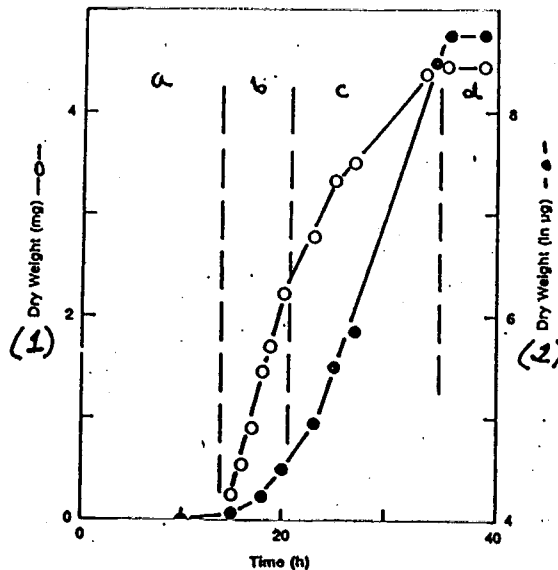
E. _____

F. _____

P.S. For your information, the conidiogenous pattern exhibited by F is characteristic of *Geotrichum lactis*, the mold mentioned in question 3 below.

NAME _____

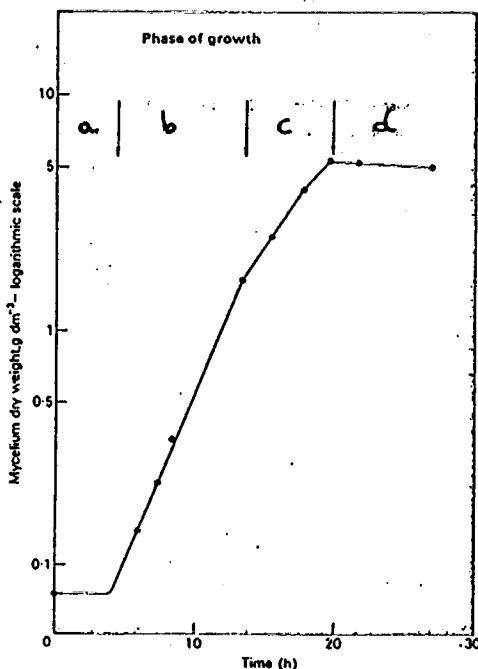
2. (7 pts) Idealized or actual graphic plots of the growth kinetics of most molds often give little or no evidence that the mold in question can grow logarithmically, but instead show that molds spend most of their time growing at a constant rate, no matter what parameter is measured. Of course, the identification of a logarithmic growth phase and a constant growth phase would be dependent upon the manner of graphing the data. Using the plots of the increase in dry weights of the mold *Aspergillus nidulans* over a 40-hour time scale as depicted below and as an example, identify specifically (by letters and numbers) these two growth phases and then describe in detail on the answer sheets why with most molds the exponential growth rate phase is usually relatively short and the constant growth rate phase is often very long.



a. log phase _____

b. constant growth phase _____

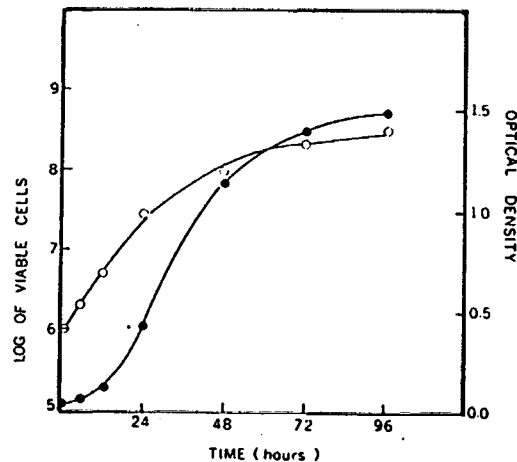
3. (7 pts) However, with some molds the exponential phase of growth may be as long as that often associated with the idealized growth curves of single celled bacteria and yeasts, as for example as illustrated below for *Geotrichum lactis*. Again, identify the exponential growth phase (by letter) and then on the answer sheets provide an explanation about why this particular mold exhibits such a long period of exponential growth, whereas *A. nidulans* did not.



a. log phase _____

NAME _____

4. (7 pts) Finally, the measurement of growth of fungi, even single cell fungi, often provide data plots that seem contradictory, such as the two plots for *Wangiella dermatitidis* reproduced below. Provide an explanation of why the optical density data seems to exhibit a lag phase and a delayed exponential phase, whereas the viable cell data exhibit no apparent lag phase and an immediate exponential phase.



5. (13 pts) On the answer sheets and in a few paragraphs describe what is known about chitin biosynthesis in *Saccharomyces cerevisiae*. Focus your answer on the identities of the genes, their enzyme products and the functions of the chitin synthesized by those enzymes and their relationships, if any, to life cycle or cell cycle events.
6. (30 pts; 2 pts each) Fill in the blanks. Use only the best mycologically acceptable terminology (e.g. basidiocarp, not mushroom).
- β (1 \rightarrow 4) polyglucosamine is commonly referred to as _____.
 - Lysine biosynthesis among species of the Kingdom Fungi is by the _____ pathway, which distinguishes these organisms from those of the fungal-like protists of the Kingdom Chromista (Oomycota and Hyphochytridiomycota).
 - Mannans in the cell walls of fungi are usually covalently attached to noncarbohydrate entities, which together are termed _____.
 - Oomycota and Hyphochytridiomycota may have chitin in their cell walls, but are distinguished from fungi by their ability to synthesize and incorporate _____ into their cell walls.
 - The dark spot that appears in the tip of living and growing hyphae of some fungi when viewed by light microscopy is the _____.
 - The microtubule organizing center of *Saccharomyces cerevisiae* is the _____.
 - The dense body that appears in the nucleolus of *S. cerevisiae* yeast cells entering meiosis, but not mitosis, seems to be the precursor of structures known as _____, which in turn seem to aid homologous chromosome pairing.

NAME

- h. *Schizosaccharomyces* species are ascomycetous yeasts that by virtue of their cell division mechanics are commonly called _____.
- i. Members of the form-genera *Rhodotorula*, *Cryptococcus* and *Candida* are members of the form-class _____.
- j. The crater-like structure left on mother cells after cell division and cell separation in *S. cerevisiae* is the _____.
- k. Small sporangia produced by some Zygomycetes, which usually contain relatively few sporangiospores, are called _____.
- l. The exogenous mitospores so characteristic of Hyphomycetes are called _____.
- m. Karyospores of Oomycota like *Achlya* and *Saprolegnia* species are called _____.
- n. Misshapen cells of *Saccharomyces cerevisiae* arrested in normal budding growth due to the presence of a mating pheromone are called _____.
- o. After conjugation and karyogamy, newly formed diploids of *S. cerevisiae* begin to bud their first progeny cell in such a manner that the resulting misshapen cell is called a _____.

7. (24 pts @ 4 pts each) Definitions/Short Answers.

- ### a. Vesicle-mediated cell wall synthesis

- ### b. Vectorial chitin biosynthesis

NAME _____

c. Chitin- β -glucan cell wall category

d. Microfibrillar cell wall polymers

e. Secondary zoospore of *Saprolegnia*

f. Multipolar budding yeast