DEPARTMENT OF THEORETICAL & APPLIED BIOLOGY

YEAR THREE SEMESTER TWO

BIOL 358 – MYCOLOGY

Mildew – a surface fungi that can be identified as a patch of grey or white fungus that is lying on the surface of a moist area

ATTEMPT ALL.

DURATION: 50 minutes

eg. white-rot fungi can degrade xenobiotic compounds *mushrooms

1) Define and Explain the following terms

a) Mycoremediation – A form of bioremediation, the process of using fungi to degrade contaminants in an environment usually soil

b) Dumping-off disease – a horticultural condition caused by several different pathogens that weaken or kill seeds or seedlings before or after germination

c) Mildew – a form of fungus, closely related to mold but appears white and less invasive and harmful

d) Antibiotic – antimicrobial agent made from microorganisms and can kill and inhibit the growth of microbes.

e) Filamentous – a single thin thread like object (hyphae here), or appendage especially

f) Conidium – an asexual, non-motile spore of a fungi usually produced @ the tip, on conidiophores.

2) Differentiate between the following pairs of related term

a) Mould/Yeast – multicellular / unicellular – reproduce by budding

b) Lower/Higher – no fruiting body

c) Arthrospore/Chlamydospore – (a) sexual spores / not regarded as a true spore (part of the hyphae breaks into a spore) – Large resting pore spore is enveloped before it breaks off – formed from fragmentation

d) Rhizomorph/Mycelial strand – Less complex, in thick strands / cord-like – more prominent – resistant to unfavourable – exhibit division of labour

e) Brown/White rot

f) Gametangia copulation/contact

g) Mycotoxin/Mycotoxicoses

3) a) What are the advantages of fungi over plant and animals as research tools?

b) What are the advantages of fungi over bacteria as regards bio-remediation. adapt to pH extremes and saline environ

c) i. State anyone fugal disease of any important crop. Black pod disease of cocoa.

ii. Describe the mode of transmission of the disease in (i)

iii. What are the causative agents? Phythophthora sp

iv. Outline the control methods of the answer provided in (C) i. copper fungicides, remove infected trees early

4) Complete the following sentences

a) Hyphal anastomosis refers to ..hyphal fusion.. and forms an integral part of ..sexual.. reproduction and it is ..widespread.. and very common in ..higher.. but has been reported in a few ..lower.. as well.

b) The major chemical constituent of the fungal cell wall is ..various polysaccharides.. and examples include (i) ..glycans.. (ii) ..cellulose.. (iii) ..chitin.. of which the most predominant is ..chitin.. Other constituents of the cell wall may include ..proteins, lipids..

Glycogen

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YEAR THREE SEMESTER TWO

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Glycogen

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

DEPARTMENT OF THEORETICAL AND APPLIED BIOLOGY

THIRD YEAR SECOND SEMESTER, 2013/2014

BIOL 358 (MYCOLOGY) QUIZ TWO.

5TH MARCH 2014 TIME: 35 MINS

1. Distinguish between the following
   a. Yeast and Mould
   b. Lower Fungi and Higher Fungi
   c. Soredia and Insidia
   d. Mycelium and Hyphae
   e. Endomycorrhiza and Ectomycorrhiza
   f. Obligate parasitic fungi and Facultative Parasitic fungi.

2. Account for the limitations/drawbacks in the definition of fungi.
3. State the major growth forms of the heteromerous type of lichen thalli and compare any two.
4. Which ONE is better and why; FUNGI / BACTERIA, as a Bioremedial tool / plant.
5. Describe the various anastomotic tendencies in fungi.
6. Coenocytic hypha is also known as .....
7. Fungal fusion occurs in a few ..... notably in the vesicular ..... in the ..... but it is more common ..... Such as ..... and .....
8. a. List the specialized somatic differentiated hyphal appendages.
   b. Relate the structure to function in any TWO of the above hyphal appendages.
9. List the essential nutrients that should be present in a media needed to culture fungus and state the sources of these nutrients.
10. Outline some importance of the symbiotic associations undertaken by the fungi for its growth and development.
11. Why are lichens used in measuring pollution intensity?

J.L TERLABIE

DEPARTMENT OF THEORETICAL AND APPLIED BIOLOGY

MYCOLOGY

QUIZ 1 (45 MINUTES)

36

INDEX NUMBER.....4519115.....

1. Fungal cell wall is composed of .....chitin..... or .....cellulose..... or both, together with other complex organic molecules.

2. Why are the slime moulds not strictly regarded as fungi?

They do not have hyphae
Their vegetative phase consist of plasmodium

3. What are some of the limitations of the definition of term "fungi'

1. True fungi do not have cell wall.
2. Few fungi do not have filaments.

4. There are some organisms mycologists have studied more or less by default but are probably not fungi. The vegetative phase consists of plasmodium and it is a multinucleate mass of protoplasm lacking cell wall. These are .....~~pseudoslimes~~ cellular..... and .....plasmodial..... slime moulds.

Streptomyces rodosus

5. Ainsworth divided fungi into 2 categories. These are;

1. Zygomycota — Myxomycota
2. Eumycota — Eumycota.

Aspergillus
Penicillium griseofulvum

6. Indicate the importance of fungi in the following areas:

a. Human diseases

They causes diseases such as athlete foot rots, jock itch etc in humans.

b. Plant diseases — Fungi cause diseases in plants, typical example ~~Fungi~~ black pod diseases

c. Cocoa industry — A fungi species such phytophthora sp causes ~~fungi~~ black pod disease in cocoa:

8

d. Plant growth

Fungi forms symbiotic association of plants, ~~such as~~ example mycorrhiza, which provides a greater surface area for the absorption of water, nutrients for plant growth

e. Industry – fungi such as yeast are used in the ~~bas~~ baking and brewing industry to cause fermentation

7. Complete the table below

Name of antibiotic	Source organism(fungi)	Usage
Cephalosporin 0.5	Cephalosporium acremonium 0.5	Treatment of bacterial infection 0
Streptomycin 0	Streptomyces griseus 0	Treatment of bacterial infection 0

NB: antibiotic does not include **PENICILLIN**

8. What are the two main divisions of Phycomycetes

~~Zygomy~~ Zygomycotina | Zygomycotina

~~Myxomy~~ Myxomycotina | Mastigomycotina.

9. These are membrane structures lying between the plasma membranes and the cell walls, they are unique to the fungal family and are not common in other organisms.

Lomasomes 0.5

10. Give the differences between these related pairs of terminologies

2 haplaid nuclei a diploid nucleus

i. Dikaryotic cell and synkaryotic cell

– Synkaryotic cell is a cell containing single nucleus in a diploid number of chromosomes 2

– Dikaryotic cell is a cell containing two nuclei a haploid number of chromosomes

6.5 Zygomycotina Myxomycotina 2

ii. Lichen and mycorrhiza

~~Lichens – an symbiotic association between algae and pla~~

~~Mycorrhiza – an symbiotic association betwe~~

Lichen – a symbiotic association between alga and plant

Mycorrhiza – a symbiotic association between fungi and absorbing structures

iii. Higher fungi and lower fungi

Higher fungi – they have complex structure and fruit body

Lower fungi – they have less complex structure and lack fruit body.

2

cord-like parallel structures that carry mycelium to portions of the substratum when the hyphae encounters surfaces with little or no food.

a thick strand of somatic hyphae that exhibits division of labour, more prominent than mycelial strand and can withstand adverse conditions.

iv. Mycelial strand and rhizomorph

both are aggregated structures

Rhizomorph – Is a linear strands of mycelium

Mycelial stands – Is a cord-like stands

0.5

v. Appresorium and haustorium

Differentiated

Appresorium – A surface hyphae that is used for penetration of cell

Haustoria – substrate hyphae used for attachment to its host

2

discrete aggregate hyphae of parasites formed attached to host surface through which infection hyphae can grow into the host.

substrate hyphae used in anchorage and nutrient absorption.

vi. Infection cushion and rhizoid

Rhizoids – are structures found in Rhizopus and used for anchorage and feeding.

1

Infection cushion – a multicellular penetration structure eg Botrytis

vii. Hyphae and mycelium

Hyphae – they are vegetative, thread-like structure

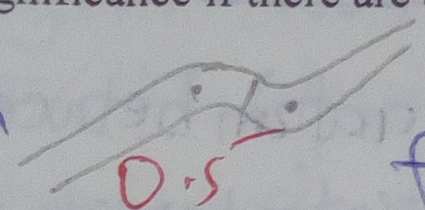
mycelium – Is a mass of hypha forming a colony.

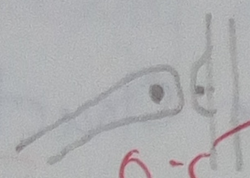
2

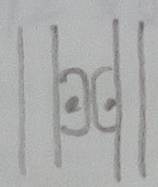
3

9.5

11. With the aid of a diagram, describe the three main types of hyphal anastomosis and state their biological significance if there are any

1. Hypha to hypha  0.5 — it occurs when two different hyphae fused together and exchange their nuclear material

2. Hyphal to peg  0.5 — When the presence of hypha induces bulge of another hyphae to fuse together.

3. Peg to Peg  0.5 — When two induced bulges fused together in exchanging their nuclear material

12. Briefly describe the two kinds of septation and state its importance in a fungi

1. Primary septa 2. Adventitious septa

Primary septa is found in higher fungi and less lower fungi. They are used for classification in fungi 0.5

Adventitious septation is found in lower fungi as well as some higher fungi.

Importance: They are used in classification of fungi 0.5

13. State any structure that is associated with fungal septa and their function

Networked hyphae — is the vegetative part of fungi and helps in the reproduction of fungi 0

~~Constrictive~~

14. Make an annotated diagram of a dolipore septum and state the group of fungi that it is mainly associated with

Basidiomycetes

7

Thermophilic fungi – are small assemblage in mycota that have a minimum temperature of growth at or above 20°C

15. Explain and give an example of a fungi that falls under the ff.

Vesicular- arbuscular endomycorrhiza – Is a association between the fungi and its absorbing structures such as Bryophytes, the hyphae penetrates the cell and ~~have~~ hence, it is intracellular fashion
eg Botryzius sp

Ectomycorrhiza – ~~Is the type association where there is an~~
It is an ~~an~~ intercellular fashion between the fungi and the plant roots. the hyphae between host and its cell.
eg Cladosporium sp

16. Ectomycorrhiza 0.5 is a type of mycorrhiza in which the fungal component forms a hartig net

Complete the following statements

17. Thermophilic fungi refers to fungi that thrive in harsh condition or temperature above 50°C. 0

18. Which does better in an acidic medium, fungi or bacteria
Fungi 0.5

19. Which of the two requires a higher carbohydrate content in a media, bacteria or fungi.....Fungi.....0.5

20. The term dimorphism refers to fungi having two different forms of structure. 1

5/5

15. Explain and give an example of a fungi that falls under the ff.

Vesicular- arbuscular endomycorrhiza

Vescular- arbuscular endomycorrhiza where the fungi swells into vesicles and branches with a short branch.

Eg: Pythium - Endogonales, Basiomycetes * Orchid endomycorrhiza, Rhizoctoni

Ectomycorrhiza ~~grow intercellular fashion of mycorrhi~~

Grow in an intercellular fashion outside the cells of the root (hairs)

* Truffles ~~Ascomycetes~~, Amanita, Leccinum, Russula, Suilus

Ectomycorrhiza

16. ~~Endo~~mycorrhiza is a type of mycorrhiza in which the fungal component forms a hartig net

Complete the following statements

17. Thermophilic fungi refers to fungi that can survive at higher temperature conditions at a maximum of 50°C

18. Which does better in an acidic medium, fungi or bacteria

0.5

19. Which of the two requires a higher carbohydrate content in a media, bacteria or fungi ....fungi... 0.5

20. The term dimorphism refers to changes in the morphology of a fungi cell due to differentiation, having different life forms

DEPARTMENT OF THEORETICAL AND APPLIED BIOLOGY

MYCOLOGY

QUIZ 1 (45 MINUTES)

33.5

INDEX NUMBER.....4532615.....

1. Fungal cell wall is composed of ...chitin... or ...cellulose... or both, together with other complex organic molecules.

2. Why are the slime moulds not strictly regarded as fungi?
Because none of their life cycle has vegetative phase as hyphae.
** the vegetative phase of the slime moulds is plasmodium which consists of multinucleated protoplasm.

3. What are some of the limitations of the definition of term "fungi"
- Some true examples of fungi ~~almost~~ are not filamentous.
- Some filaments of fungi donot have cell wall.
- Some algal species also have similar characteristics
* some true algae has lost their chlorophyll making them achlorophyllous as fungi.

4. There are some organisms mycologists have studied more or less by default but are probably not fungi. The vegetative phase consists of plasmodium and it is a multinucleate mass of protoplasm lacking cell wall. These are ...cellular... and ...plasmodial... slime moulds.

5. Ainsworth divided fungi into 2 categories. These are:
1. Myxomycota (slime moulds)
2. Eumycota (true fungi: Higher and lower fungi).

6. Indicate the importance of fungi in the following areas:

a. Human diseases;
1. They cause diseases like aspergillosis (respiratory tract disease) O.S (Candidiasis, Mucormycosis)
2. They cause allergens (e.g. allergic reactions)

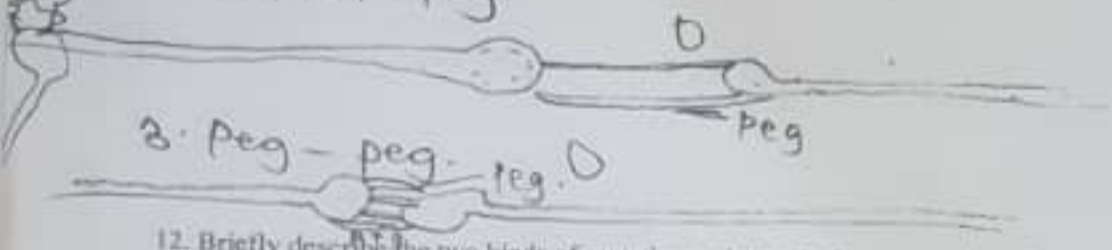
b. Plant diseases
- They cause plant diseases like shoot and root rots (leaf blight, brown patch, canker, leaf rust, bottom rot.)
- Parasitic fungi produce pathogens

c. Cocoa industry
- Some fungi cause black pod disease in cocoa, it decreases the yield and quality of cocoa pods for processing.

11. With the aid of a diagram, describe the three main types of hyphal anastomosis and state their biological significance if there are any

1. Hyphal – Hyphal

2. Hyphal - peg



3. Peg – peg. peg. 0

12. Briefly describe the two kinds of septation and state its importance in a fungi

1. Dichotomous branching is a form of branching where the apical region ceases to grow (elongate) but forks into two equal (evenly) branches.

*

2. Subapical branching is where the apical region of the hypha elongates continuously with the production of a lateral branch.

*

* Last page (6)

13. State any structure that is associated with fungal septa and their function

- Pores (septal pores) they facilitate a channel for the transportation of the protoplasm from one cell to another 0 * Vegetative growth
- Septal plate holds the septal cells firmly

3

14. Make an annotated diagram of a dolipore septum and state the group of fungi that it is mainly associated with Basidiomycota

Mycology Quiz

1. Describe with diagrams the various hyphal branching.
2. Explain how various fungi have been used in the area of research.
3. List examples of fungi that have been used in the area of research.
4. Give the definition of fungi and identify the error with research.
5. List 4 fungi that have caused harm in factories in the times past
6. Give the economic importance of fungi in the following areas;
   i. Sanitation
   ii. Health
   iii. Industry
   iv. Agriculture
7. Complete the following statements;
   i. Endomycorrhiza are…
   ii. Fruiting bodies are….
   iii. Thermophilic fungi refer to…
   iv. Dimorphism is.
8. Firdaus decided to isolate fungi. She decided to use chlorophenol during the process. Why did she do so?
9. A growth medium was prepared for fungi and carbon wasn`t included in the medium. What is likely to be the effect of this?
10. Differentiate between the following;
    i. Conidia and sporangiophores
    ii. Mould and yeast
    iii. Powdery mildew and down mildew
    iv. Coenocytic and acoenocytic hyphae
    v. Haustorium and appressorium
    vi. Endomycorrhiza and ectomycorrhiza
11. Why is it preferrable to use fungi instead of bacteria in waste management
12. Describe hyphal anastomosis and state the various types.
13. Why are fungi used in replenishing striped mind land
14. Explain the following;
    i. Hyphal septation
    ii. Anastomosis