

HCS612 – Final exam

Name.....

4 December 2003, Kottman 116

Complete 10 of the following questions (clearly show which 2 questions you do not answer)

Each question is worth 10 points. 1 page of summary notes is allowed. Time allowed 1.5 hr

Question 1

a) Define sustainability (2)

Give 4 ways that grasslands are more sustainable compared to other land-use options?

b)

c)

d)

e)

and 4 ways that grasslands are less sustainable than other land-use options

f)

g)

h)

i)

Question 2

a) What is the “Rivet Popper Theory” and how does it relate to the biodiversity of grasslands? (3)

b) What is “Technology Masking” and how does it apply to sustainability of grasslands? (3)

c) What are the four (4) key components of grassland sustainability, and how might each of these be measured or quantified (4)

i)

ii)

iii)

iv)

Question 3

a) In addition to providing forage for livestock, what are 5 other (non-traditional) uses of grasslands (one sentence for each)

i.

ii.

iii.

iv.

v.

Question 5

a) What are 4 benefits of high biodiversity grassland?

- i)
- ii)
- iii)
- iv)

b) What are 4 disadvantages of high biodiversity grassland?

- v)
- vi)
- vii)
- viii)

c) What are 2 methods by which grassland biodiversity can be measured?

- ix)
- x)

Question 6

During class you each worked on a project each. For a project other than your own, describe:

a) In 2-3 sentences what was the project about? (what were the objectives) (2)

b) What methods did that person use to test their objectives? (2)

c) What were their main results and conclusions? (2)

d) What did you learn from their project? (2)

e) What is one point (question) you might want clarified, or for the presenter to have given more detail? (2)

Question 7 Select the best answer

- a) NDF is always
- greater than ADF
 - less than ADF
 - approximately equal to ADF
 - unrelated to ADF
- b) A typical level of soil organic matter in grassland is:
- 1%
 - 3%
 - 10%
 - 13%
- c) NIR is an abbreviation for:
- Nitrogen-imposed release
 - Non-irradiation reflectance
 - Near-Infrared reflectance
 - Nutrients intra-rumeno
- d) RFLP is an abbreviation for:
- release-fragment loss product
 - rapidly functioning labile protein
 - robotically functioning laboratory program
 - restriction fragment length polymorphism
- e) Compared to C3 species, warm-season grasses are:
- more tolerant of dry conditions and low carbon dioxide concentrations
 - less tolerant of dry conditions and low carbon dioxide concentrations
 - more drought tolerant, but less tolerant of high temperatures (30 C)
 - less drought tolerant, but more tolerant of high temperatures (30 C)
- f) Novel endophytes are specific races of an endophyte species that:
- are not transmitted by seed
 - do not produce ergovaline
 - increase drought tolerance
 - can infect all grass species
- g) Shannon's index is a measure of grassland biodiversity influenced by:
- species richness
 - relative abundance of species
 - both of the above
 - none of the above
- h) The most volatile and water soluble nutrient is :
- NO_3^-
 - SO_4^{2-}
 - C
 - PO_4^{3-}
- i) The biggest limitation of forage for energy production from biomass is:
- high ash content
 - ensuring a year-round supply of biomass
 - the low cost of coal
 - all of the above
- j) A fertilizer labeled with the numbers 6-15-40 contains :
- 6% N
 - 6% NO_3^-
 - 6% P_2O_5
 - 15% NH_4^+

Question 8

The components of a nutrient balance for grassland comprise inputs or losses from the soil pool.

a) What are four (4) sources of nitrogen in grassland, and a typical value for the annual input of N from each source? (5)

b) What are four (4) losses of nitrogen from grassland, and a typical value for the annual loss of N from each mechanism? (5).

Question 9

a) Grasslands classically comprise a mixture of grasses and legumes. What are two common grass-legume associations found in grasslands of the world? (2)

b) There are at least 7 factors affecting grass-legume balances. Name four (4) of these factors and a sentence to describe its effect on the grass-legume balance. (8)

i)

ii)

iii)

iv)

Question 10

a) What are the two main sources of carbon that have contributed to the increase in atmospheric carbon during the last 100 years (2)

b) What is the scope for grasslands to accumulate (sequester) additional carbon? (4)

c) What grassland management practices can increase carbon sequestration? (4)

Question 11

a) What are four functions of roots in grasslands (4)

i)

ii)

iii)

iv)

b) What is the effect of water stress on root growth? (2)

c) What is the effect of grazing on root growth? (2)

d) What is the effect of low fertility on root growth? (2)

Question 12

In 4-6 sentences, describe how information from this course might help you in your future career