

HCS612 - Mid-term exam

Name.....

28 October 2004

Kottman 334, 8:00-9:48 am

- Complete 10 of the following questions (clearly show which 2 questions you do not answer)
- Each question is worth 10 points.
- Closed book exam, 1 page of notes is allowed

Question 1) Knowledge of animal intake is important in grassland management. What are 2 reasons why such information is important (4)

a)

b)

c) Describe briefly the digestive mechanism of proteins in ruminants. Explain the significance of microbial protein, the site of protein (N) absorption in the intestine, and the mechanism and significance of by-pass protein (3)

d) Describe briefly energy metabolism in the ruminant. Explain the significance of soluble sugars, lignin, hemicellulose, fecal energy, and methane as factors related to the digestion of high and low quality forages (3)

Question 2

Almost every forage has the potential to be toxic, or contain anti-quality compounds. Complete the blank cells in the following Table

Plant species	condition	symptom	Causal mechanism
1. Most legumes	Bloat	Distorted rumen	
2. Tall fescue	Endophyte poisoning	Shaggy coat, elevated body temp., reduced intake	
3. (give 2 species)	Nitrate poisoning	Breathing difficulties, death	Accumulations of nitrates in regrowth that followed 1" of rain after 3 weeks drought, nitrates converted to nitrites that bind hemoglobin
4. Sweet clover	Sweet clover poisoning		Coumarin (harmless) is converted to dicoumarol during heating & spoilage of hay, dicoumarol is the anti-coagulant warfarin
5. Red clover (old varieties), subterranean clover	Estrogen toxicity	Impaired reproductive performance	

Question 4) Multi-choice. Circle the only correct answer

- 4.1 A convenient calibration for converting pasture height to mass is:
- 25 lb dry matter/ac per inch
 - 2500 lb dry matter/ac per inch
 - 25 kg dry matter/ha per inch
 - 150 kg dry matter/ha per cm
- 4.2 The Latin name for kura clover is:
- Trifolium repens*
 - Trifolium pratense*
 - Trifolium ambiguum*
 - Trifolium subterraneum*
- 4.3 ADF is the abbreviation for:
- all digested fiber
 - acid detergent fiber
 - acid detergent forage
 - abomasum-digested fiber
- 4.4 The difference between the ADF and NDF value of a forage is mainly due to:
- lignin
 - protein
 - water soluble carbohydrates
 - hemicellulose
- 4.5 Non-toxic (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
- 4.6 A 100 acre farm with 50 paddocks, 80 cows and a grazing rotation of 25 days will have:
- a stocking density of 20 cows/ac and a stocking rate of 20 cows/ac
 - a stocking density of 20 cows/ac and a stocking rate of 0.8 cows/ac
 - a stocking density of 0.8 cows/ac and a stocking rate of 20 cows/ac
 - a stocking density of 0.8 cows/ac and a stocking rate of 0.8 cows/ac
- 4.7 NDF is always
- greater than ADF
 - less than ADF
 - approximately equal to ADF
 - unrelated to ADF
- 4.8 Bypass protein is the protein which:
- is bypassed during grazing
 - is digested during rumination
 - is not digested, and passes through the animal
 - is protected from digestion in the rumen and is digested in the intestine
- 4.9 Sweet clover can be distinguished by:
- pinnate leaves (leaflets are not connected at the peduncle), serrated leaf tips
 - palmate leaves (leaflets are connected at the peduncle), serrated leaf tips
 - pinnate leaves (leaflets are not connected at the peduncle), serrated around all leaflet margins
 - palmate leaves (leaflets are connected at the peduncle), serrated around all leaflet margins
- 4.10 The $-3/2$ tiller rule in grasslands relates to the slope of the relationship between:
- tiller size and tiller density
 - log tiller size and tiller density
 - log tiller size and log tiller density
 - tiller size and log tiller density

Question 5) Legumes are a critical component of the nitrogen cycle in grasslands, since they fix N_2 from the atmosphere and incorporate it into plant protein. Give 5 pathways by which legume-N eventually becomes available to grasses.

a)

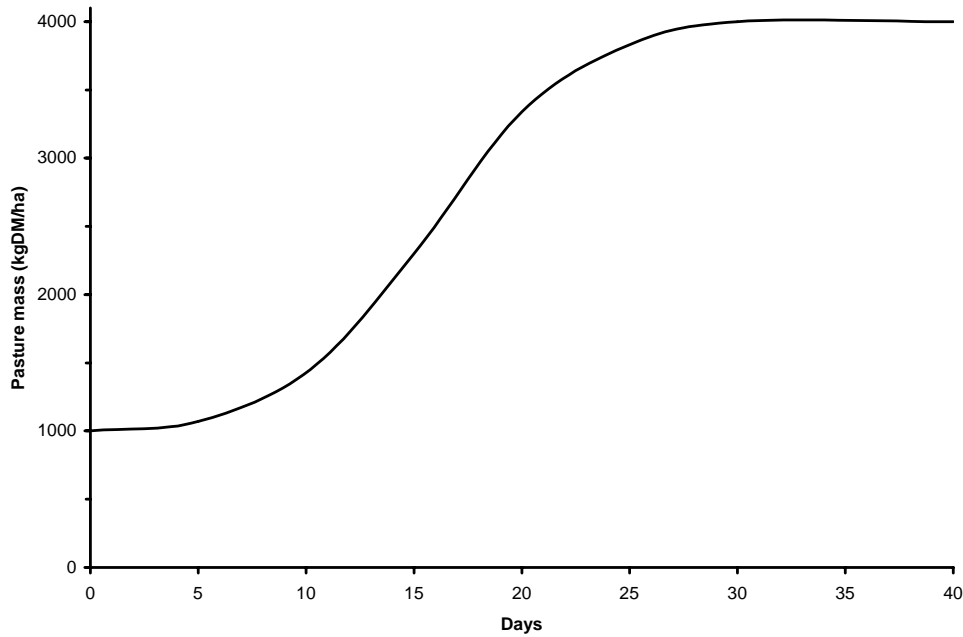
b)

c)

d)

e)

Question 6) A typical pasture regrowth curve is given below:



- a) Label (X-A) the point on the curve having highest growth rate (theoretically, continuous grazing to maintain this mass would maximize yield)
- b) Label (X-B) the point on the curve that might be typical for the pre-grazing mass for an infrequent-lax grazing regime
(mass =, days =)
 - c) Label (X-C) the point on the curve that might be typical for the post-grazing mass for an infrequent-lax grazing regime
(mass =, days =)
 - d) Calculate the average growth rate for b-c as (change in mass/regrowth period)
 - e) Label (X-D) the point on the curve that might be typical for the pre-grazing mass for an frequent-intense grazing regime
(mass =, days =)
 - f) Label (X-E) the point on the curve that might be typical for the post-grazing mass for an frequent-intense grazing regime
(mass =, days =)
 - g) Calculate the average growth rate for e-f as (change in mass/regrowth period)

Question 8) Give 5 ways that forage affects animal intake, and briefly (1-2 sentences) explain the nature of this effect.

a)

b)

c)

d)

e)

Question 9) a) what is endophyte?

b) Give 2 reasons why livestock on endophyte infected grassland have lower production?

c) Name 2 plant species that do not contain endophyte?

d) How do endophytes in tall fescue differ from endophytes in ryegrass?

e) What are 2 management recommendations you would give a farmer who wanted to reduce the amount of endophyte on his farm?

i)

ii)

Question 10) Describe 5 methods used to measure pasture mass or pasture growth rate. Briefly describe an advantage and disadvantage of each method

a)

b)

c)

d)

e)

Question 11)

Annual forages have potential to be used as second crops within traditional crop systems. Describe 2 different annual forage crops, and how they might be used between traditional grain crops (2-3 several sentences for each) (6)

a)

b)

c) What are 2 advantages from integrating forage crop and grain crop systems (2)

i)

ii)

d) What are 2 disadvantages from integrating forage crop and grain crop systems (2)

iv)

v)

Question 12)

Rotational grazing is popular on many grazing farms, however experimental comparisons between rotational grazing and continuous grazing do not always show any production advantage.

a) Give 2 reasons why a farmer might use rotational grazing.

i)

ii)

b) Give 2 reasons why a farmer might use continuous grazing.

iii)

iv)

c) Describe 2 reasons why production advantages occur for rotational grazing

v)

vi)