

Final Exam HCS412 – Forages

Name:.....

9:00 am Tuesday 29 May 2001

10:00 am Friday 1 June 2001

9:30 am Wednesday 6 June 2001

Instructions:

Complete Question 1 (required) and 12 other questions from the 15 options.

All questions carry equal credit (10 points per question), except Question 1 - 5 points

The exam has a total of 125 points

Show working and units in all calculations

Time allowed: 1 hr 48 minutes

Question 1 (Required)

For one forage species you are familiar with, state:

Common name (0)

a) Latin name (1)

b) Name of one variety (1)

Write one key point on each of the following:

c) The most distinguishing feature to identify the species (1)

.....
.....

d) The main advantage/benefit of this species (1)

.....
.....

e) The biggest disadvantage/limitation with this species (1)

.....
.....

Question 2

Plants can respond to drought at various levels:

a) Give 2 examples of plant community responses to water or drought

b) Give 2 examples of plant morphological responses to drought

c) Give 2 examples of plant physiological responses to drought

d) Give 2 examples of plant molecular or biochemical responses to drought

e) Briefly describe 2 irrigation methods

Question 3

The following Table summarizes examples of advantages and disadvantages of the predominant methods for establishment of a new forage crop. Complete the Table with TWO (2) examples in each of the six empty cells

	Advantages	Disadvantages
Full cultivation		
No-till (direct) drilling		
Frost seeding		

Question 4

Complete the sentence with the most appropriate keyword from the list provided

- a) is the summation of factors affecting animal preference of a forage, and might include taste, smell, texture and familiarity.
- b) Drought is the suite of changes in a plant that improve its ability to tolerate drought
- c) is the proportion (or percentage) of forage digested by an animal (intake-excreted) divided by its intake, usually on a dry matter basis.
- d) The of silage is typically in the range 4-5%
- e) When improperly made has hay, sweet clover has which is a powerful anti-coagulant which can cause bleeding disease in livestock.

(protein, energy, adaptation, digestibility, palatability, lactic acid, dicoumarin, dry matter)

Question 5

- a) How does the green:dead ratio affect forage quality

- b) How does species composition affect forage quality?

- c) How does the leaf:stem ration affect forage quality?

- d) How does cell structure affect forage quality?

- e) How does maturity affect *forage quality*

Question 6

The 4 main stages occurring in a silage silo (or bunker) after the crop has been harvested are aerobic phase, lag phase, fermentation phase and stable phase

- a) What is the most important process happening during the aerobic phase?

- b) What management practice can keep the aerobic phase short?

- c) What is the most important process happening during the fermentation phase?

- d) What management practice can help is the fermentation phase?

- e) Approximately how long after storage does it take to begin the stable phase (i.e. when the silage can first be used)?

Question 7

A confinement dairy farm has 600 cows each producing 22,000 lb of milk. The farm has 100 acres available for effluent dispersal, and which produces 12,000 of forage/acre/yr.

The P-balance equation is:

$$\text{Net P balance} = \text{P import} - \text{P export}$$

- a) Calculate how much forage should be purchased (assume each cow consumes 10,000 lb forage/year)

- b) Calculate the P import (assume the purchased forage is 0.3%P)

- c) What is your assumption about fertilizer use in calculating P import in part b)?

- d) Calculate P export (assume milk is 0.1%P)

- e) What is your assumption about leaching and erosion losses in calculating P export in part d)?

Question 8 – multi-choice. Circle the only correct answer

12.1 The most important time to make hay is:

- a) when the sun shines
- b) the afternoon
- c) at night when there is dew on the crop
- d) when leaf area index (LAI) equals 3

12.2 The Latin name for annual ryegrass is:

- a) *Lolium multiflorum*
- b) *Lolium hybridum*
- c) *Lolium perenne*
- d) none of the above

12.3 The typical pH of silage is

- a) 2
- b) 3
- c) 4
- d) 5

12.4 NDF is short for:

- a) non-digested fiber
- b) neutral detergent fiber
- c) neutral detergent forage
- d) non-dietary fiber

12.5 The difference between the ADF and NDF value of a forage is mainly due to:

- a) lignin
- b) protein
- c) water soluble carbohydrates
- d) hemicellulose

12.6 The reason a farmer might consider grazing his livestock could be:

- a) to reduce feed costs
- b) to improve the dispersal of manure (nutrients) on his land
- c) to lower his costs from owning machinery
- d) All of the above

12.7 Hypomagnesaemia is due to:

- a) Mg excess in cows
- b) Ca deficiency in cattle or sheep
- c) Mg deficiency in lactating cows
- d) K deficiency in sheep

12.8 Nitrate toxicity is a problem in many warm-season grasses (e.g. sorghum-sudan grass), especially:

- a) For the new regrowth after a drought
- b) With low nitrogen fertilizer rates
- c) In spring
- d) If the legume is greater than 30%

12.9 The range of dry matter percentage that there is no suitable method for forage preservation is:

- a) <50%
- b) >75%
- c) 50-60%
- d) 60-75%

12.10 red clover can be differentiated from white clover by:

- a) the presence of rhizobia nodules on white clover roots
- b) hairy stems and leaves for white clover
- c) hairy stems and leaves for red clover
- d) the absence of a “water mark” on the leaves of red clover

Question 9

What are the four (4) key factors for making good quality hay. Briefly describe a management strategy for each that will ensure good quality for each factor.

Question 10

- a) Why do legumes generally have more protein than grasses?

- b) What is bypass protein?

- c) What range of protein concentrations can be found in forage?

- d) What is an average protein concentration in vegetative spring grass?

- e) What is the maximum forage protein concentration that is required by livestock

Question 11

There are a huge number of species found growing in forage crops that are designated weeds.

Give the common name of one weed you are familiar with.

- a) Briefly describe why this species is a weed.

- b) Briefly describe the conditions or circumstances where this weed is typically found

- c) Briefly describe the lifecycle of that species

- d) Briefly describe one management strategy to reduce or control that weed

- e) Give one beneficial factor that the weed might have.

Question 12

a) Give 4 reasons why forage-based farming systems might be more sustainable than traditional cropping systems

b) In addition to the reasons in a) give 4 reasons why grazing-based livestock systems might be more sustainable than containment livestock systems.

c) Give 2 factors that would make forage-based farming systems unsustainable

Question 13

One of the key aspects of farm management is to decide when a forage crop is to be harvested (either by grazing or cutting for hay/silage)

Give 5 factors that affect a farmer's decision to harvest a crop, and briefly outline the issue for each of these factors

Question 14

- a) What is MIG?

- b) What is stockpiled forage?

- c) What are 3 reasons a livestock producer might want to consider MIG?

- d) Calculate the rotation length for a 100 acre farm that has an average paddock size of 2 acres, and grazes 2 paddocks per day.

- e) Briefly describe how the pasture production curve and the animal demand curve do not match perfectly and what is one implication of this mis-match

Question 15

Describe how you might use information gained from HCS412 in your future career.