

Read questions at their face value. There is no deliberate attempt to confuse or mislead you on any question. Select the best answer for all fill in the blank questions and be sure to include all possible answers for a short essay questions. Complete sentences are not required, but I must be able to understand your answer.

Pts

5 1. ADF is an abbreviation for _____acid detergent fiber_____. What does ADF measure _____legnocellulose_____. ADF is used to predict this determinate of forage quality _____nutritive value_____. _____Intake_____ is the other determinate of forage quality and is generally predicted by this chemical component _____NDF_____.

7 2. Each of the determinates that you just listed above have three components and one has two aspects influencing it, list them.

- digestibility
- chemical composition
- nature of digested products
- retention time
- degradability
- passage rate
- palatability
- accessability

3 3. What is RFV, what does it attempt to do, and how is it used today?
RFV is relative feed value, it puts the nutritive value and intake estimates into one value, it is used in marketing, especially of alfalfa hay

1 4. What RFV is considered prime hay? _____>151_____

5 5. RFQ or _____relative forage quality_____ is predicted from _____TDN_____ and is considered a better estimate of forage quality than RFV because it has an estimate of this _____NDF digestibility_____. What forages does the RFQ give a better shake (higher RFQ than RFV, name two)?
first-cut alfalfa hay and grass hays

4 6. The dominate factor that affects forage quality is plant maturity or growth stage. Since you have seen this question before, give me a complete answer why this is the case considering your answer to Question 2. Maturity affects both forage quality determinates. As maturity increases, ADF and NDF increase and CP decreases; increased ADF reduces digestibility, increased NDF decreases intake. Increased maturity also changes the nature of digestive products. Increased maturity decreases degradability and slows passage rate, increased maturity also decreases palatability.

- 2 7. What component of a grass will always make it lower in forage quality than a legume when both are harvested at beginning of flowering? _____ **greater cell walls or NDF** _____

(Fill in the blank, one point/blank)

8. A forage harvested and preserved in a succulent condition by fermentation is a _____ **silage** _____.
9. A forage harvested fresh, dehydrated, and used as a protein concentrate is called _____ **dehy** _____.
10. A monocot of the Poaceae family is called a _____ **grass** _____.
11. Any herbaceous broadleaf plant on which livestock grass is called a _____ **forb** _____.
12. Semi-arid grassland with scattered bunches of short grasses, other herbaceous vegetation, and occasionally trees is called a _____ **steepe** _____.
13. Kjeldahl N multiplied by 6.25 is termed _____ **crude protein** _____.
14. True protein that is absorbed in the small intestine is called _____ **metabolized protein - digested** _____.
15. If NDF is 40% on the "as is" bases (hay is 10% moisture), NDF on the dry matter bases is _____ **$40\% / .9 = 44.4\%$** _____.
16. The two most common storage carbohydrates used in regrowth are _____ **starch** _____ and _____ **fructosans** _____.
17. Soluble carbohydrates in forages are measured by _____ **TNC** **also RAE** _____.
18. Cellulose digestibility is inhibited by _____ **lignin** _____, _____ **cutin** _____, and _____ **silica** _____.
19. Forage quality of most forages today is determined by this system _____ **NIRS** _____.
20. What morphological structure of the plant makes warm-season grasses less digestible _____ **bundle sheath** _____.
21. An indigenous grass is called _____ **native** _____.

22. A plant that gives off a chemical that affects only plants of the same species is called _____ **autotoxic** _____.
23. A better way to express yield rather than in tons/acre dry matter is _____ **nutrients/acre** _____.
24. A typical stoloniferous grass grown in this area is **_creeping bentgrass/buffalograss/rough bluegrass_**, and a typical legume with a creeping root is **_alfalfa/crownvetch/BFT_**.

One point for each TRUE or FALSE question.

(**TRUE** or **FALSE**) Forages are critical for livestock producers because >60% of all feed units for all livestock classes comes from forages; however, the cow-calf livestock enterprise obtains >95% of its feed units from forages.

(**TRUE** or **FALSE**) All wheat production in the USA has a higher economic value than alfalfa hay production.

(**TRUE** or **FALSE**) Ethanol based on crop residues and switchgrass biomass has a greater energy efficiency than ethanol obtained from corn.

(**TRUE** or **FALSE**) Valued on its replacement value in livestock rations, all forages are the most valuable crop produced in the USA.

(**TRUE** or **FALSE**) Grazing lands in the North Central and Northeast areas are nearly 100% introduced species while grazing lands in the western half of the USA are primarily native rangeland.

(**TRUE** or **FALSE**) North Dakota and Minnesota each have about 1.5 million acres of alfalfa in production, but Minnesota produces 30 to 40% more tonnage because of higher yields per acre.

(**TRUE** or **FALSE**) Weeds can have allelopathic effects on crops with broadleaf weeds generally affecting broadleaf crops more and grass weeds affecting grass crops (with some exceptions).

(**TRUE** or **FALSE**) The allelopathic chemical in alfalfa reduced plants established by 50 to 75% when seeding alfalfa on old alfalfa ground very shortly after tilling out the old stand.

(TRUE or FALSE) Jennings in Missouri found the area of influence around an old alfalfa plant was only 3 to 4 inches where productivity of newly seeded plants was reduced.

(TRUE or FALSE) If a newly seeded alfalfa field has a thin stand, attempts to thicken up the stand will be a failure due to the allelopathic effect.

(TRUE or FALSE) Wheat yields following barley are higher than wheat yields following late-season crops like corn, sunflower, and sugarbeet due to the late-season water use.

(TRUE or FALSE) Legumes are known to enhance subsequent grass crop yields in the year following the legume but have little effect thereafter.

(TRUE or FALSE) Addition of organic matter to most soils will enhance subsequent crop productivity.

(TRUE or FALSE) Tall fescue has an endophyte (Acremonium) that may cause the diseases fescue foot or fescue toxicosis, but this endophyte also imparts stress tolerance to the plant.

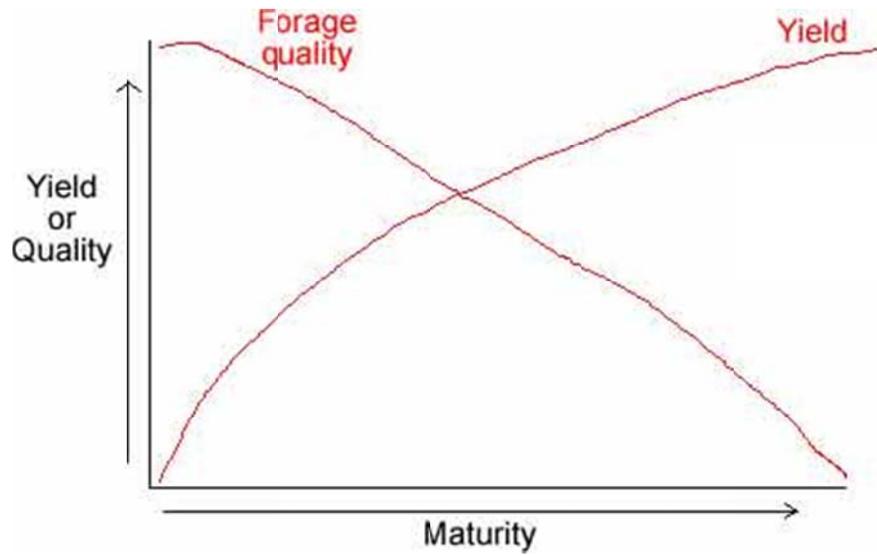
2 25. The Canadians have released AC Grazelander, which has a lower bloat potential than many hay-type alfalfas. What two plant characteristics have they changed to allow them to work toward a bloat-free alfalfa?

Less soluble protein (18 - 5) and a slower release of the soluble proteins in the rumen.

4 26. List four potentially toxic substances found in forages that have not been mentioned previously (bloat, endophyte) and the crop that is known to contain the substance.

-dicoumerol - moldy sweetclover hay
-HCN - sorghums like sudangrass
-Nitrates - drought-stressed oat hay
-alkaloids - reed canarygrass

- 4 27. Graph the normal relationship between yield and quality of a forage plant. Be sure to label your lines.



- 2 28. What is autoconditioning in alfalfa? When the alfalfa plant "remembers" exposure to the autotoxin and decreases yield for life of stand.

Upon my honor, I have neither given nor received aid in writing this exam_____